

Chapter 16

Body Electrical

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Routine Maintenance

LAMPS

Check the park lamps, stop lamps, reverse lamps, turn signals and hazard lamps for correct operation. Ensure that each lamp is illuminated clearly and the lens and lens reflector is not damaged. Renew components as necessary.

Check the bulb for a broken filament, blacked out bulb or corroded base on any lamps that are not working. If necessary, renew the bulb with one of the same voltage and wattage, which is usually marked on the side of the base. Clean the bulb base with methylated spirits or similar if corroded.

Check and adjust the headlamp aim as described under the Lamps heading in this chapter.



It is important that bulbs are replaced only with one of the same voltage and wattage. Using higher wattage headlamp bulbs than the manufacturer recommends could result in melting and discolouration of the polycarbonate headlamp lenses.

Refer to the Lamps heading in this chapter for procedures to check bulbs and remove and install lamps.

HORN

All models are fitted with two horns, located behind the left hand side of the grille.



Location of the horns.

If the horn does not work, refer to the Horn heading in this chapter for procedures to check components.

WIPERS AND WASHER

Check the water level in the various washer bottles and top up if necessary. The tailgate washer bottle is located behind a removable panel in the tailgate.

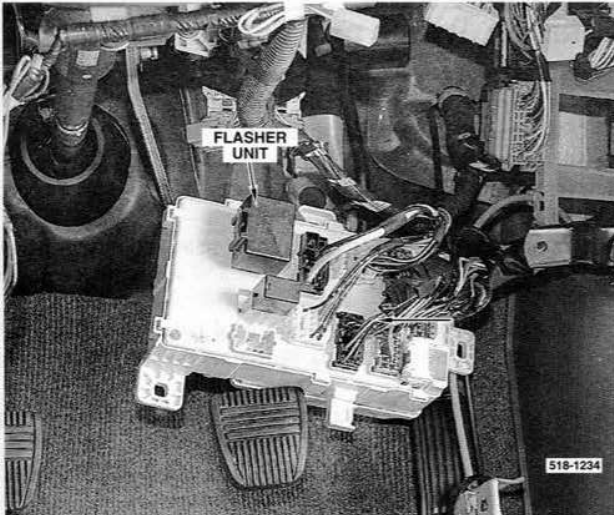


Preparing to fill the tailgate washer bottle.

Turn Signal Lamp Trouble Shooting

TURN SIGNAL LAMPS DO NOT OPERATE AND NO SOUND FROM FLASHER UNIT

- 1 Fuse blown: Rectify the fault and renew the fuse.
- 2 Faulty flasher unit: Renew the flasher unit.
- 3 Faulty turn signal switch: Renew the switch.
- 4 Fault in the wiring circuit: Check and repair the fault.



Rear of the interior fuse and relay box showing the flasher unit.

TURN SIGNAL WARNING LAMP DOES NOT FLASH BUT AUDIBLE CLICKING FROM FLASHER UNIT

- 1 Warning lamp bulb blown: Check and renew the bulb.
- 2 Fault in the warning lamp wiring: Check and repair the fault.

i When renewing bulbs, ensure that a new bulb of the correct voltage and wattage is used.

TURN SIGNAL LAMPS FLASH AT GREATER THAN NORMAL SPEED

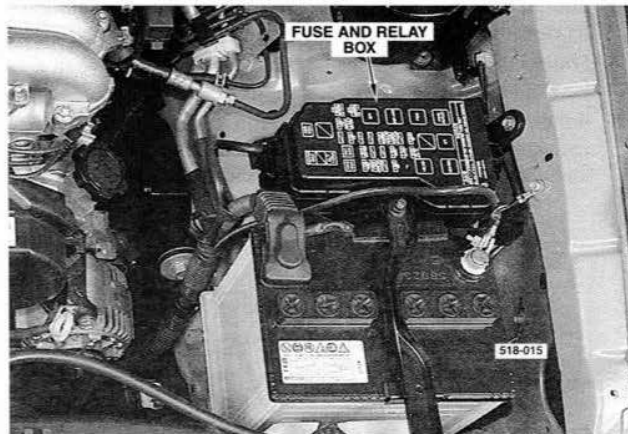
- 1 Bulb blown in the front, rear or side turn signal lamps: Check and renew the bulb.
- 2 Faulty flasher unit: Check and renew the flasher unit.

HAZARD WARNING LAMPS DO NOT OPERATE

- 1 Fuse blown: Rectify the fault and renew as necessary.
- 2 Faulty flasher unit: Renew the flasher unit.
- 3 Faulty hazard warning switch: Renew the switch.
- 4 Fault in the wiring circuit: Check and repair the fault.

Fuses, Fusible Links and Circuit Testing

Fuses protecting the various vehicle electrical circuits are located in the interior fuse and relay box under the drivers side of the dashboard. The fusible links and several fuses and relays are also installed in the engine compartment fuse and relay box, adjacent to the battery.



Engine compartment fuse and relay box location.



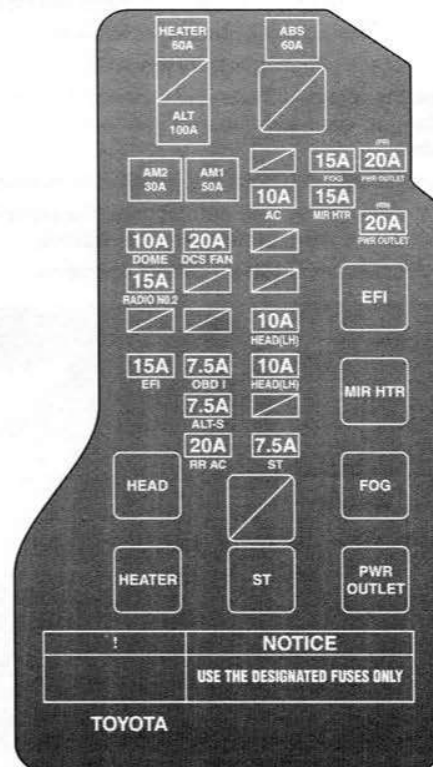
If a fuse is faulty or burnt out, use a replacement fuse of the specified amperage only. The specified amperage is marked on the fuse. The use of a higher amperage fuse than that specified could cause damage to the vehicle.

TO CHECK AND RENEW A FUSE

- 1 Remove the interior fuse and relay box cover.
- 2 Using the wiring diagrams at the end of this chapter, locate the fuse protecting the circuit at fault. Pull the fuse from the relevant fuse box and inspect it.



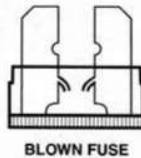
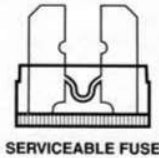
A tool to remove the fuses is located in the engine compartment fuse and relay box.



Engine compartment fuse and relay box cover.

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- 3 Should the fuse appear to be in a serviceable condition, test its continuity with an ohmmeter or test lamp.
- 4 Should the fuse appear to be faulty or burnt out, install a fuse of the same amperage.
- 5 If the circuit is still inoperative or the fuse burns out again, check the circuit as described under this heading or refer to an automotive electrician or an authorised dealer.



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TO CHECK AND RENEW FUSIBLE LINKS

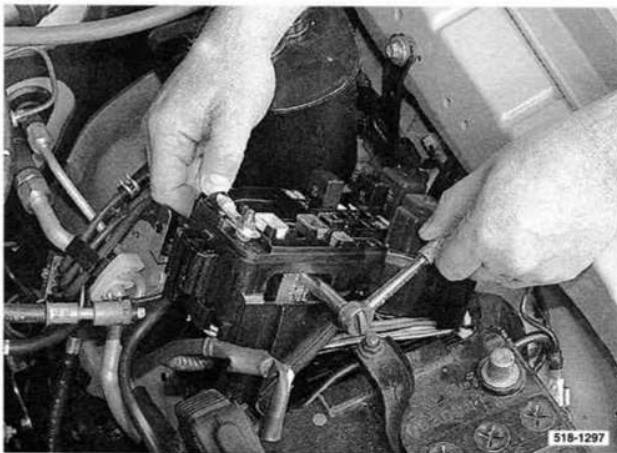
The fusible links are located in the engine compartment fuse and relay box adjacent to the battery.



If a fusible link is faulty or burnt out, use a replacement fusible link of the specified amperage only. The specified amperage is marked on the fusible link. The use of a higher amperage fusible link than that specified could cause damage to the vehicle wiring harness.

A new fusible link should not be installed until the fault that caused the original link to fail has been repaired.

- 1 Working in the engine compartment, release the retaining clips and open the fusible link cover.
- 2 Inspect the condition of the fusible link through the window in the top.
- 3 Should the fusible link appear to be in a serviceable condition, test its continuity using an ohmmeter or test lamp.
- 4 If the fusible link is faulty, proceed as follows:
 - a Disconnect the negative battery terminal.
 - b Remove the retaining bolts and raise the fuse box. Release the retaining clips and separate the lower cover from the fuse box.
 - c Remove the retaining bolts and remove the fusible link.
 - d Install a new fusible link and tighten the retaining bolts. Connect the negative battery terminal securely.
- 5 Check the relevant circuit for correct operation.



Removing one of the fusible links retaining bolts. Another bolt is located in a similar position on the opposite side of the fuse box.

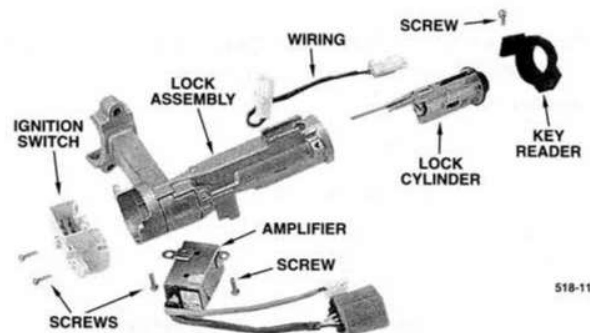
TO TEST CIRCUITS

- 1 Turn the circuit switch On.
- 2 Using a test lamp, check for power at one of the circuit connections. A fuse is a good starting point.
If power is available, reconnect the connector and continue checking towards the motor or bulb end of the circuit.
If power is not available, continue checking towards the battery or switch end of the circuit.

Ignition Switch and Lock Cylinder**TO RENEW — IGNITION SWITCH**

- 1 Remove the lower dash panel as follows:
 - a Remove the screws retaining the bonnet and fuel door remote handles. Push the handles towards the front of the vehicle to release.
 - b Remove the bolt and screw, and partially remove the panel. Disconnect the wiring connectors and withdraw the panel from the dashboard.
 - c Release the air duct from the fittings, by pulling the ends of the duct firmly downward. Withdraw the duct from under the dashboard.
- 2 Press the tab and disconnect the ignition switch wiring connector from the top of the switch.
- 3 Remove the retaining screws and, noting their installed position, withdraw the switch from the lock assembly.

Installation is a reversal of the removal procedure.



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Ignition switch and associated components.

TO RENEW — LOCK CYLINDER

- 1 Disconnect the negative battery terminal and withdraw the ignition key.
- 2 Perform step 1 as described under Ignition Switch.
- 3 Release the clips and withdraw the ignition key surround panel.
- 4 Remove the screw retaining the ignition key reader, disconnect the wiring connector and withdraw the key reader.
- 5 Put a 90 degree bend in a piece of wire of approximately 3 mm diameter.
- 6 Insert the ignition key in the lock and turn the key to the ACC position. Insert the short end of the wire into the hole provided and depress the locking latch, while gently pulling the lock cylinder from the housing.

Installation is a reversal of the removal procedure with attention to the following points:



Removing the lock cylinder from the lock housing.

- 1 Ensure that the recess in the ignition switch is aligned with the tang on the operating lever.
- 2 Turn the ignition key to the ACC position and install the lock cylinder in the lock housing, until it clicks into position.
- 3 Install the key reader and connect the wiring connector securely.

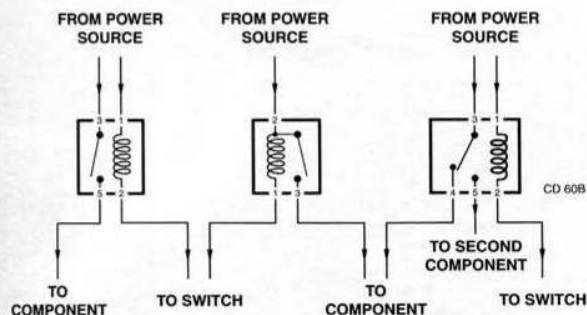
Switches and Relays

TO TEST SWITCHES

Most switches have more than two wires entering the switch. One wire will be from the power source (battery or ignition), the second wire takes power from the switch to the component, or the component relay. A third wire may be used to power a small bulb in the switch for illumination, in which case there will also be a fourth wire to earth the bulb.

- 1 Access the switch by removing it from the component. Refer to the appropriate heading for a removal procedure if necessary.
- 2 Referring to the wiring diagrams at the end of this chapter, locate the colour(s) of the wire going from the power source to the switch and the wire going from the switch to the component or the component relay.
- 3 Disconnect the wiring connector from the switch and using an ohmmeter, check the resistance between the appropriate terminals of the switch.

There should be no resistance with the switch in the On position and open circuit with the switch in the Off position. Renew the switch if necessary.



Typical three, four and five pin relays. Terminal identification may differ.

RELAYS

A relay can be described basically as a remotely operated switch. It can carry a greater current from the power source to the components than a small switch could. Having a relay in a circuit eliminates the need for heavy duty switches and thick wiring running to the switches and instrument cluster assembly. When the component switch is turned On, a small solenoid closes two contacts in the relay allowing power to run from the power source to the component. In these illustrations, power is supplied to the solenoid from the power source. The switch, when On, completes the path to earth, energising the solenoid and closing the contacts allowing power to flow from the power source to the component.

On the five pin relay, the extra terminal allows power to flow from the power source to a component, such as a low beam headlamp bulb. When the solenoid is energised, the contact moves across allowing power to flow to the second component, such as a high beam headlamp bulb.

This is just one example of how a relay can be wired into a circuit. There are numerous applications and wiring combinations.

The various relays employed in the vehicle electrical system are located in the engine compartment fuse and relay box. Several relays are also located in various positions beneath the dashboard.

Not all vehicles are equipped with all relays, because of different equipment levels. To renew a relay, pull the relay from the relay box. When installing a relay, ensure that the relay terminals are making good electrical contact. Many relays are of the same type. This can be confirmed by the colour or size/shape of the relay.

This is useful when trouble shooting as a known good relay can be substituted for a faulty one to check the circuit.

To Check

- 1 Remove the relay from the housing or connector.
- 2 Using an ohmmeter, check that continuity exists between terminals 1 and 2.
On 5 pin relays, check that continuity exists between terminals 3 and 4.
- 3 Using jumper leads, connect terminals 1 and 2 to battery power.
Continuity should exist between terminals 3 and 5.



Continuity should exist between terminals 2 and 3 on the horn relay.

- 4 On 5 pin relays, ensure there is no continuity between terminals 3 and 4.



Refer to Part 1 of Fuel and Engine Management (chapter 7) for procedures to check the circuit opening relay, ECU relay and the low temp sub fuel pump relay. Also refer to Cooling System (chapter 5) for procedures to check the cooling fan relays.

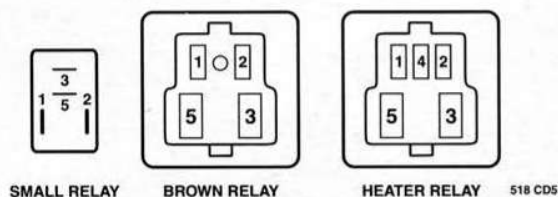


Illustration showing the terminal identification of the various relays used on this vehicle. The terminals are illustrated as viewed from beneath the relay.

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COMBINATION SWITCH

The combination switch consists of the headlamp and parking lamp switch on the right hand side and the wiper and washer switch on the left hand side of the steering column. The removal and installation procedure is similar for all of these switches.

To Remove and Install

- 1 Where fitted, disable and remove the airbag. Refer to Body (chapter 17).
- 2 Remove the steering wheel as described in Steering (chapter 12).
- 3 Remove the screws retaining the lower steering column cover. Release the clips retaining the upper steering column cover and manoeuvre both covers from the steering column.

TIP If necessary, remove the screw and bolt retaining the lower dash panel and lower the panel, clear of the steering column covers.

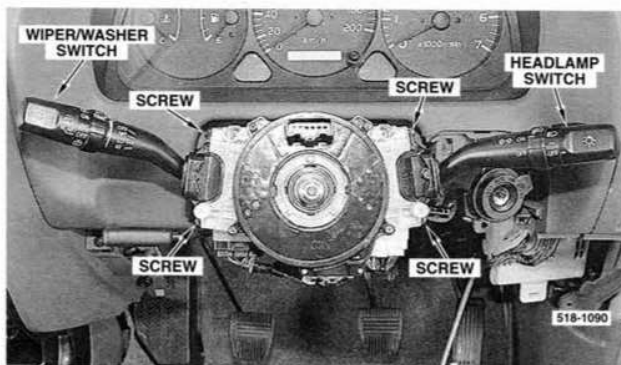


Location of the steering column cover retaining screws.

- 4 Remove the screws retaining the relevant switch to the steering column. Partially remove the switch assembly from the base plate, disconnect the wiring connector from the switch and remove it from the vehicle.

Installation is a reversal of the removal procedure with attention to the following points:

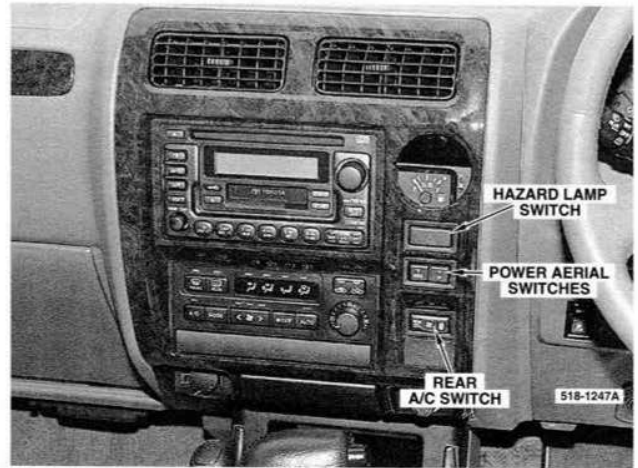
- 1 Connect the wiring to the switch and install the switch assembly to the base plate. Tighten the retaining screws securely.
- 2 Install the steering column covers, the steering wheel and the airbag if applicable. Refer to Steering (chapter 12), if necessary.
- 3 If removed, install the lower dash panel.



Combination switch installed.

RADIO SURROUND PANEL SWITCHES

The radio surround panel contains the hazard lamp and on some models, the power aerial and the rear air conditioning switches. The removal and installation procedure is similar for all of these switches.



Radio surround panel switches installed.

To Remove and Install

- 1 Using a flat bladed screwdriver wrapped in cloth, gently prise the trim panel surrounding the switches and withdraw it from the surround panel.
- 2 Gently prise the relevant switch from the radio surround panel and partially withdraw the switch.
- 3 While pressing the lock tang, disconnect the wiring connector from the switch and withdraw it from the surround panel.

TIP If difficulty is experienced disconnecting the relevant wiring connector, remove the screw and bolt retaining the lower dash panel and lower the panel. Access the wiring connector by reaching up into the opening behind the lower dash panel.

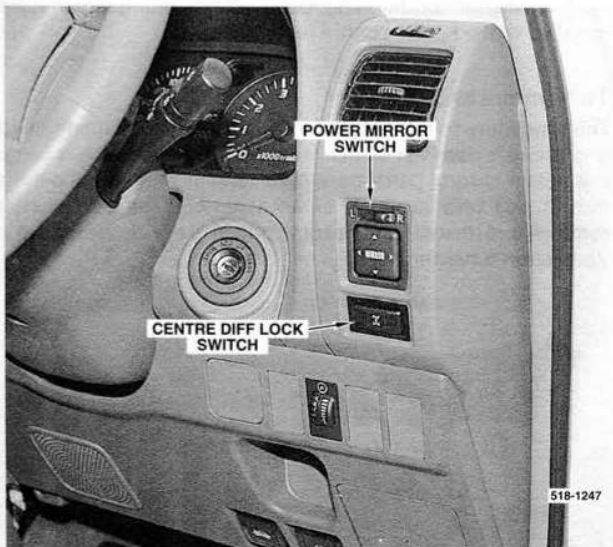
Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



Removing the switches from the radio surround panel.

INSTRUMENT PANEL SWITCHES

The power mirror and on some models the centre differential lock switch is located in the instrument panel. The removal and installation procedure is similar for all of these switches.



Instrumental panel switches installed.

To Remove and Install

- 1 Using a flat bladed screwdriver wrapped in cloth, gently prise the switch trim panel and partially withdraw it from the instrument panel.
- 2 While pressing the lock tang, disconnect the wiring connector from the rear of the relevant switch and withdraw the switch from the instrument panel.

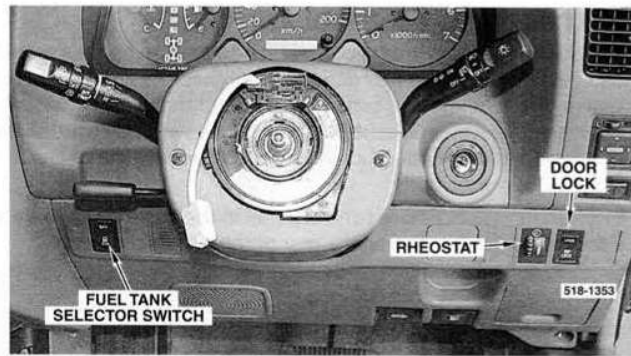
Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



Removing the power mirror switch from the instrument panel.

LOWER DASH PANEL SWITCHES

The lower dash panel contains the rheostat, the fuel tank selector switch and on models without power windows, the door lock switch. The removal and installation procedure is similar for all of these switches.



Lower dash panel switches installed.

To Remove and Install

- 1 Working under the steering column, remove the bolt and screw retaining the lower dash panel.
- 2 Lower the panel away from the dashboard and disconnect the wiring connector from the relevant switch.
- 3 Release the clip retaining the switch while pushing the switch towards the steering wheel and withdraw it from the lower dash panel.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.

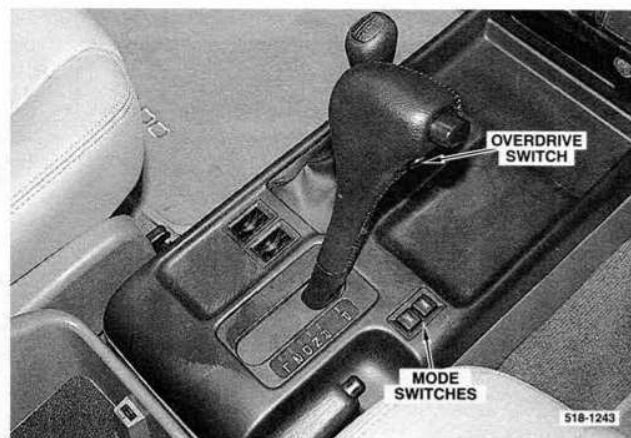
AUTOMATIC TRANSMISSION SWITCHES

The overdrive switch is located on the right hand side of the selector lever handle. The procedure to remove and install the overdrive switch is described in Automatic Transmission (chapter 11). The automatic transmission mode switch consists of the Power and Second Start switch. The mode switch is located in the centre console, adjacent to the selector lever base.

To Remove and Install

- 1 Using a flat bladed screwdriver wrapped in cloth, gently prise the mode switch and partially withdraw it from the centre console.
- 2 While pressing the lock tang, disconnect the wiring connector from the rear of the switch and withdraw the switch from the centre console.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



The automatic transmission switches are located on the selector level and on the centre console.

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HEATER/CLIMATE CONTROL SWITCHES

On models with climate control, the climate control panel contains the front and rear demister switches, the airflow control switch, the temperature control switch and the various switches operating the climate control. The various switches controlling the climate control operations are part of the face panel and are not available separately.

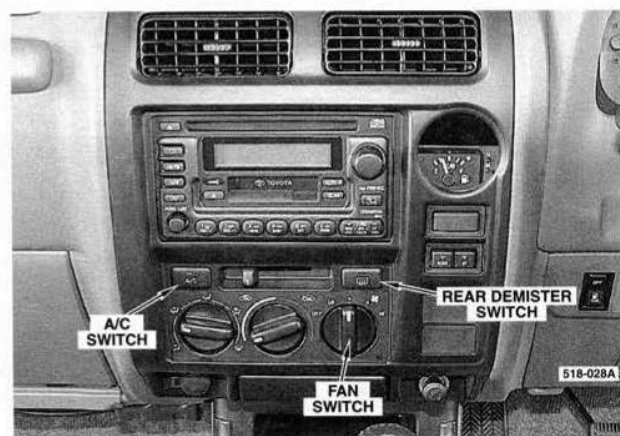
In addition to the climate control panel in the dashboard, there is a control panel installed to the rear of the centre console.



Removing the climate control panel from the rear of the centre console.



Climate control panel switches installed.



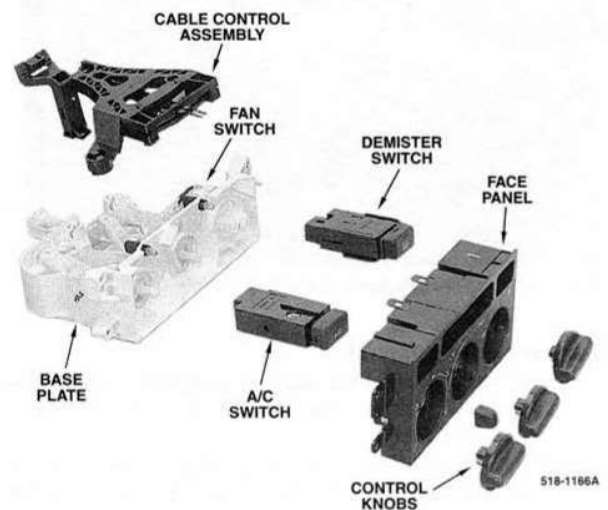
Ventilation control panel switches installed.

The procedure to dismantle the climate control panel assembly is described in Ventilation (Chapter 18).

On models without air conditioning, the fan switch and the rear demister switch are located in the heater control panel. On models with air conditioning, the air conditioning switch is also installed to the heater control panel.

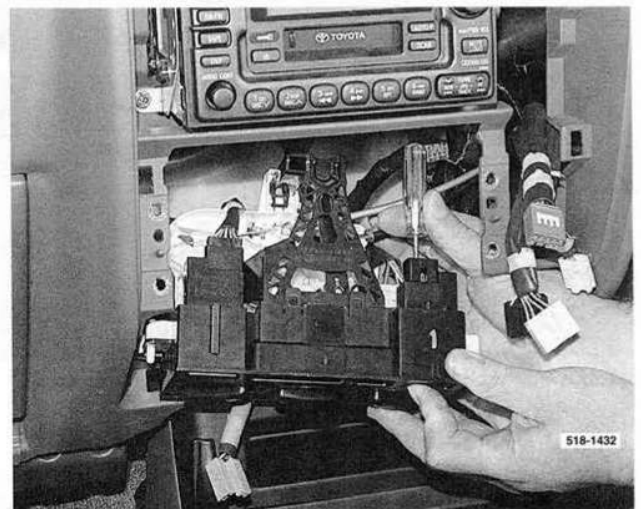
To Remove and Install

The procedure to remove and install the air conditioning switch and the rear demister switch is similar. The fan switch is part of the heater control panel base plate, and at the time of publication, it was only available as an assembly. The procedure to remove and install the heater control panel is described in Ventilation (Chapter 18).



Ventilation control panel dismantled showing the various switches.

- 1 Remove the radio surround panel, referring to the Body (Chapter 17), if necessary.
- 2 Remove the screws retaining the heater control panel and release it from the locating pins. Lower the panel.
- 3 Disconnect the wiring connector from the relevant switch.



Releasing the demister switch retaining tab, using a thin screwdriver.

- 4 Release the tab retaining the switch, and withdraw it from the rear of the face panel.



A thin screwdriver may be needed to release the air conditioning switch retaining tab.

Installation is a reversal of the removal procedure.

REVERSE LAMP SWITCH

On automatic transmission models the reverse lamp switch forms part of the inhibitor switch. The switch can be checked and adjusted as described in Automatic Transmission (chapter 11).

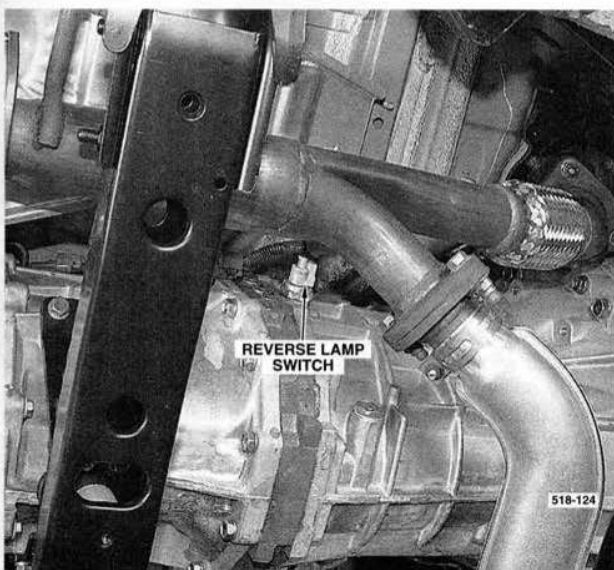
On manual transmission models, use the following procedures.

To Test

- 1 Switch the ignition On and select reverse gear. The reverse lamps should operate.
- 2 If the reverse lamps do not operate, switch the ignition Off and disconnect the wiring connectors from the reverse lamp switch on the right hand side the transmission.
- 3 Connect a jumper lead between each terminal of the reverse lamp switch wiring connectors.
- 4 Switch the ignition On and check the reverse lamps. If the reverse lamps now operate, the reverse lamp switch can be considered faulty and should be renewed.
- 5 If the reverse lamps still fail to operate with the switch connector terminals bridged, check the condition of the lamps, the fuse and the wiring. Refer to the wiring diagrams later in this chapter.

To Remove and Install

- 1 Raise the front of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.
- 2 Disconnect the wiring from the reverse lamp switch on the right hand side of the transmission.
- 3 Unscrew the reverse lamp switch from the transmission housing



Reverse lamp switch installed. Manual transmission models.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Inspect the condition of the washer. Renew if necessary.
- 2 Tighten the switch to a torque of 44 Nm.

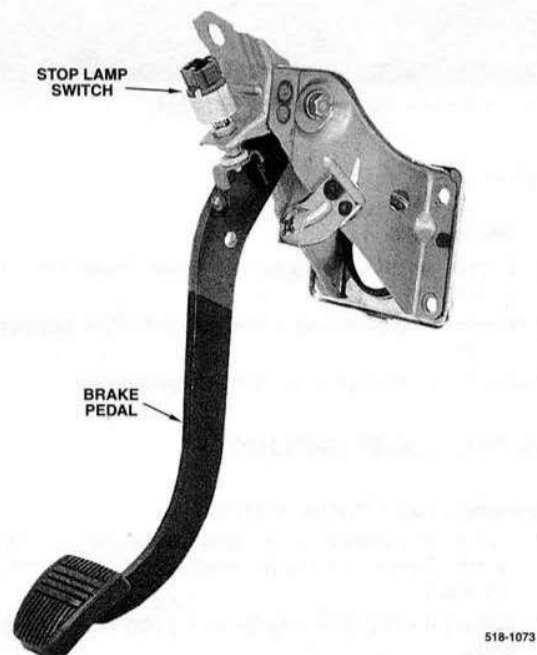
STOP LAMP SWITCH

To Test

- 1 Switch the ignition On, depress the brake pedal and have an assistant check if the stop lamps operate.
- 2 If the stop lamps do not operate, proceed as follows:
 - a Working under the steering column, remove the bolt and screw retaining the lower dash panel.
 - b Partially remove the panel, disconnect the wiring connectors and lower the panel to the floor of the vehicle.
 - c Release the air duct from the fittings, by pulling the ends of the duct firmly downward. Withdraw the duct from under the dashboard.
 - d Disconnect the brake pedal return spring and disconnect the wiring connector from the stop lamp switch.
 - e Connect a jumper lead between the wiring connector terminals and switch the ignition On. If the stop lamps operate, the switch requires renewal. If the stop lamps do not operate, check the fuse, lamps and wiring. Refer to the wiring diagrams later in this chapter.

To Adjust

- 1 Remove the lower dash panel as described under the previous heading.
- 2 Loosen the stop lamp switch locknut and rotate the switch until the stop lamps extinguish when the pedal is released and illuminate as soon as the pedal is depressed.
- 3 Tighten the locknut and check that the adjustment is still correct.



Brake pedal assembly removed, showing the stop lamp switch.

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To Renew

- 1 Remove the lower dash panel, the air duct and the return spring as described under the heading To Test.
- 2 Disconnect the wiring connector.
- 3 Loosen the locknut and unscrew the stop lamp switch from the brake pedal bracket.

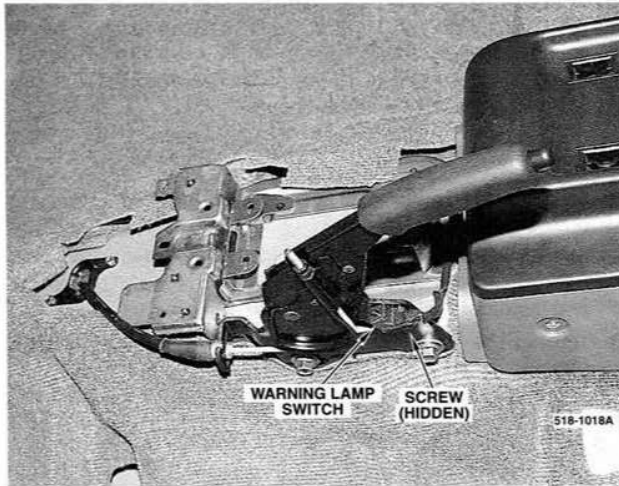
Installation is a reversal of the removal procedure, ensuring that the stop lamp switch is adjusted as previously described.

HANDBRAKE WARNING LAMP SWITCH

To Check

- 1 Gain access to the handbrake warning lamp switch as described under the renewal procedure.
- 2 Disconnect the wire from the switch and bridge the wire to earth.
- 3 Renew the switch if the handbrake warning lamp illuminates with the engine running.

If the handbrake lamp does not illuminate, check the fuse, the wiring and the bulb.



Handbrake warning lamp switch installed.

To Renew

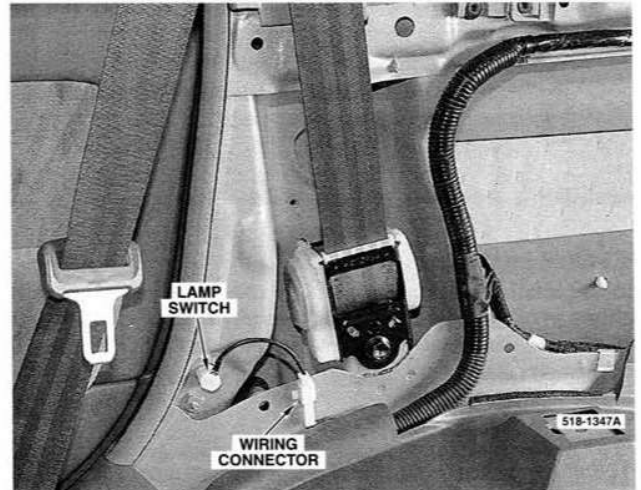
- 1 Remove the rear of the centre console from the vehicle, referring to Body (chapter 17), if necessary.
- 2 Disconnect the wiring from the handbrake warning lamp switch.
- 3 Remove the retaining screw and withdraw the handbrake switch.

Installation is a reversal of the removal procedure.

COURTESY LAMP SWITCHES

To Remove and Install — Doors

- 1 Remove the relevant trim panel covering the courtesy lamp switch. Refer to Seat Belts heading in Body (chapter 17), if necessary.
- 2 Release the clip retaining the wiring connector to the vehicle body.
- 3 Release the locking tab and disconnect the wiring connector.



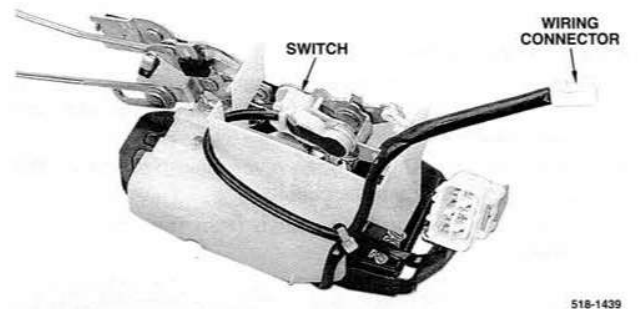
The door courtesy lamp switch wiring connectors are located behind the seat belt trim panels.

- 4 Raise the rubber seal covering the outside of the switch. Remove the retaining screw and withdraw the switch from the vehicle body.

Installation is a reversal of the removal procedure.

To Remove and Install — Tailgate

The tailgate courtesy lamp switch is integral part of the lock assembly and cannot be renewed separately. Refer to Body (chapter 17) for the procedure to renew the tailgate lock assembly.



The tailgate courtesy lamp switch is part of the lock assembly.

Power Windows

The power window switch, when moved to the Down position, supplies battery power to the power window motor which winds the window down. Moving the power window switch to the Up position, reverses the polarity of the power to the window motor. This causes the window motor to rotate in the opposite direction, winding the window up. The drivers window has a slightly different switch. Depressing this switch further down makes the window wind all the way down without having to hold the switch. A short time after the window has reached the bottom of it's travel, the switch will automatically return to its rest position. This is done by measuring the current draw on the window motor. When the window has reached the bottom of it's travel the current draw on the power window motor increases, this acts upon an internal circuit within the switch assembly and releases the switch to the rest position.

TO CHECK

- 1 Attempt to operate the power windows.

If none of the windows will operate, remove the master switch assembly from the drivers door as described later under this heading and check for power at the blue wire with the ignition On. Use the wiring diagram to trace the fault if power is unavailable.

If at least one window operates, proceed to step 2.

If power is available, check for continuity to earth at the power window master switch white/black wire and repair as necessary.

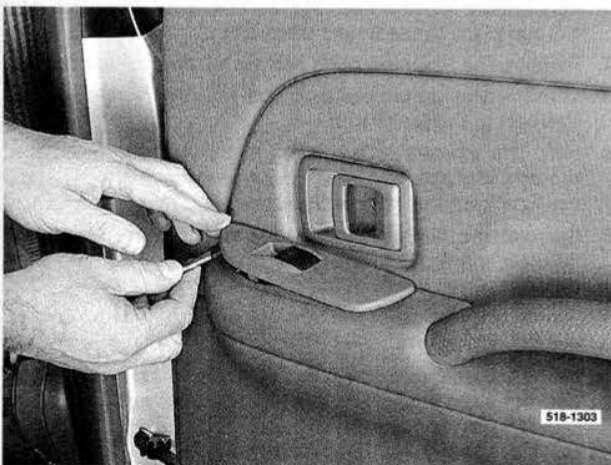
- 2 Using the wiring diagrams, check for the appropriate power and earth supplies to each motor or the motor that is not working.
If the appropriate power and earth supplies are not leaving the switch assembly, renew the power window switch assembly.
- 3 If the switch assembly is supplying power and earth as required, remove the door trim panel from the door with the faulty window. Refer to Body (chapter 17).
- 4 Disconnect the wiring connector from the power window motor and connect a test lamp between the terminals of the wiring connector. The test lamp should illuminate whenever the power window switch is pressed in either direction.

i It will be necessary to connect the power window switch wiring connectors on the passenger doors for this test to work. The test lamp should also illuminate when the switch on the door is operated.

If using an LED type test lamp, the lamp may only illuminate with the current flowing in one direction. If, for example, the test lamp only illuminates when the power window switch is moved to the Up position, alternate the test lamp leads and check if the test lamp now illuminates in the Down position. If so, this does not indicate a fault.

If the test lamp does not illuminate, check the wiring between the door and the power window switch assembly for an open circuit.

- 5 If the test lamp is illuminating as required, check for continuity between the motor wiring connector terminals, using an ohmmeter. If an open circuit is indicated, renew the power window regulator assembly as described in Body (chapter 17).



Removing a rear power window switch.

TO REMOVE AND INSTALL POWER WINDOW SWITCHES

- 1 Using a flat bladed screwdriver wrapped in cloth, gently prise the power window switch and partially withdraw it from the door trim panel.
- 2 While pressing the lock tang, disconnect the wiring connector from the rear of the switch panel and withdraw the switch from the trim panel. Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.

TO REMOVE AND INSTALL MOTOR

The power window motor is an integral part of the window regulator and if faulty, must be renewed as an assembly. A procedure to remove the window regulator is described in Body (chapter 17).

Power Mirrors

The power mirror is operated by two small motors. One motor controls horizontal movement and the other motor controls the vertical movement of the mirror.

Changing the polarity alters the direction of rotation of each motor, allowing the mirror to move in each direction.

The switch assembly in the instrument panel operates in two modes. Rotating the lever on the multi-functional switch, allows movement of the left and right hand mirrors using the one switch assembly.

Some models may have a third motor which retracts the mirror heads on both mirrors by depressing a button on the switch assembly. This function is useful for driving in confined spaces to prevent damaging the mirrors.

TO CHECK

- 1 Remove the power mirror switch, as described under this heading and check for battery power with the ignition On at the grey wire. If battery voltage is not available, use the wiring diagrams to trace the fault.
- 2 Ensure that there is continuity to earth at the white/black wire. Repair as necessary.
- 3 Disconnect the driver side mirror wiring connector and place a test lamp between the green and light green wire on the wiring connector.

i If the fault is in the passenger side mirror only, it will be necessary to remove the trim panel from the passenger door and check voltages at the passenger side mirror.
Ensure that the selector lever on the switch is pointing to the mirror being tested. For example, if working on the driver side mirror, the lever should be pointing to the driver mirror.

- 4 The test lamp should illuminate when the switch is moved to either the In or Out position, with the ignition On.

i If using an LED type test lamp, the lamp may only illuminate with the current flowing in one direction. If, for example, the test lamp only illuminates when the multi-functional switch is moved to the In position, alternate the test lamp leads and check if the test lamp now illuminates in the Out position. If so, this does not indicate a fault.

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- 5 Repeat steps 3 and 4 between the red and light green wire, ensuring that the test lamp illuminates when the switch is moved to either the Up or Down positions.
- 6 If the test lamp does not illuminate at one or more of these checks, and the wiring and connections are not open circuited, renew the power mirror switch.
- 7 If no fault can be found, check the continuity between the red and light green wires and also the light green and green wires at the faulty mirror. If an open circuit is indicated at either or both wires, renew the mirror.

TO REMOVE AND INSTALL SWITCH

- 1 Using a flat bladed screwdriver wrapped in cloth, gently prise the switch trim panel and partially withdraw it from the instrument panel.
- 2 While pressing the lock tang, disconnect the wiring connector from the rear of the relevant switch and withdraw the switch from the instrument panel.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



Removing the power mirror switch from the instrument panel.

TO REMOVE AND INSTALL MIRRORS

The procedure to remove and install the exterior power mirrors is described in Body (chapter 17).

Power Seats

The driver side front power seats installed to Grande models covered by this manual have an eight way seat adjustment. Four separate electric motors provide horizontal, vertical, tilt and lumbar support adjustments. The motors installed to the track assembly control the sliding, the raising and reclining of the seat. A motor installed into the backrest operates the seat lumbar support.

The passenger side seat on Grande models has three separate motors to provide horizontal, vertical and tilt adjustment. The motors are attached to the seat frame. The motors are controlled by switches on the outside of each seat.

POWER SEAT SWITCH**To Remove and Install**

- 1 Remove the relevant front seat as described in Body (chapter 17) and place the seat on a clean cloth.
- 2 Remove the adjusting levers from the switch, by carefully pulling them off the shafts.
- 3 Remove the screw retaining the outer trim panel. Carefully release the locking tab retaining the trim panel to the seat frame. Partially withdraw the trim panel and disconnect the wiring connector(s).
- 4 Remove the retaining screws and withdraw the switch assembly from the trim panel.



The driver side seat has a separate switch for the lumbar support.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Ensure that the wiring connectors are secure and the wiring is not trapped.
- 2 Securely tighten the seat retaining bolts.

POWER SEAT MOTORS**To Remove and Install — Except Slide Motor**

- 1 Remove the relevant front seat as described in Body (chapter 17) and place the seat on a clean cloth.
- 2 Remove the screw retaining the outer trim panel. Carefully release the locking tab retaining the trim panel to the seat frame. Partially withdraw the trim panel and disconnect the wiring connector(s).
- 3 Remove the retaining screw, release the locking tab and withdraw the inner trim panel.
- 4 Remove the retaining bolts and withdraw the backrest and the seat cushion.
- 5 Disconnect the wiring connector from the relevant motor, remove the retaining bolts and if applicable, the retaining nut. Withdraw the motor from the seat frame.

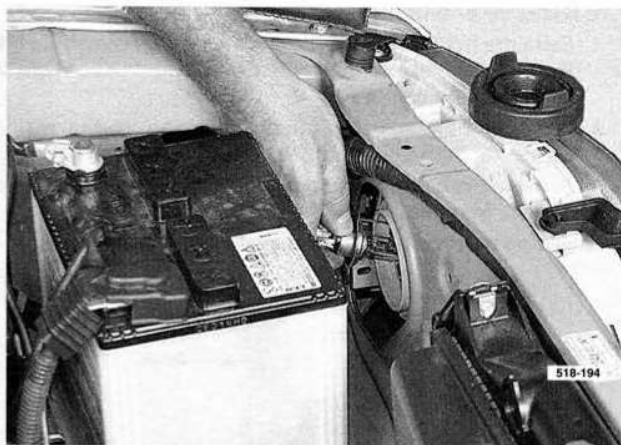
Installation is a reversal of the removal procedure, ensuring the wiring connector is securely connected.

To Remove and Install — Slide Motor

- 1 Remove the relevant front seat as described in Body (chapter 17) and place the seat on a clean cloth.
- 2 Remove the retaining bolts and withdraw the seat cushion.
- 3 Remove the bolts retaining the adjuster screw support brackets to the seat frame.
- 4 Hold the adjuster screw, using pliers wrapped in cloth to prevent damage to the screw, and remove the nuts and washers from the front of the screw.
- 5 Remove the bolts retaining the front and the rear of the adjuster screw. Disconnect the wiring connector and withdraw the assembly from the seat frame.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Install the washer to the adjuster screw and apply Permatex Locknut or an equivalent thread locker to the adjuster screw retaining nuts prior to installation.
- 2 Securely tighten the retaining bolts and connect the wiring connector.



Removing the headlamp bulb.

Lamps

BULBS

Different types of bulbs are used throughout the range of vehicles covered in this manual and it is important that if renewing bulbs, the correct voltage, wattage and type is used.

The voltage and wattage is usually stamped on the bulb base or glass. A bulb stamped 12V/21W means that the bulb is a 12 volt bulb with 21 watts of power.

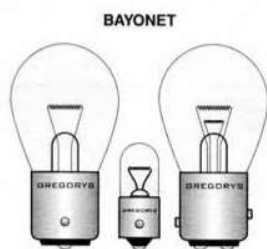
Dual filament bulbs are used in the stop/tail lamps. These are basically two bulbs in one base. For example, if the bulb is stamped 12V 21/5W, then this means that the bulb is a 12 volt bulb with 21 watts of power at one filament and 5 watts of power at the second filament.

To Test Bulbs

- 1 Remove the bulb from the bulb holder.
- 2 Connect a jumper lead between the positive battery terminal and the contact at the base of the bulb.
- 3 Connect another jumper lead between the negative battery terminal and the base of the bulb. The bulb should illuminate.

If the bulb has two filaments, connect the positive jumper lead to the second contact on the base of the bulb. The second filament should illuminate.

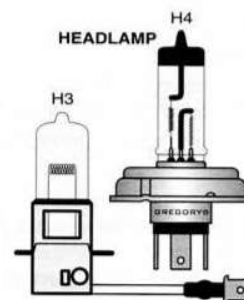
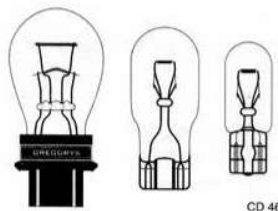
If the bulb fails to illuminate, it should be renewed with a bulb of the correct voltage and wattage.



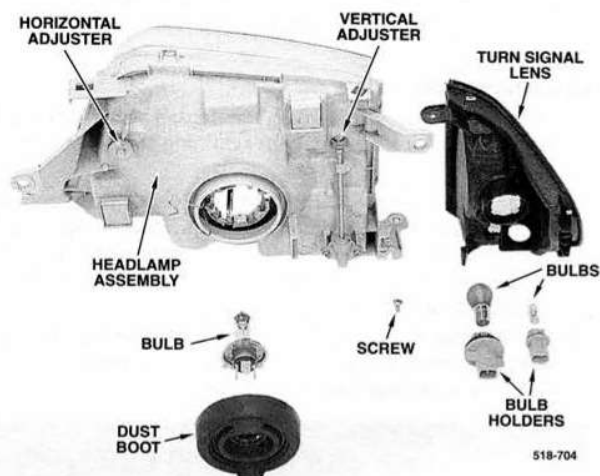
FESTOON



WEDGE TYPE



Various globes commonly fitted to motor vehicles.



Headlamp components.

HEADLAMP

To Renew Bulb

- 1 Disconnect the wiring connector from the rear of the bulb.

i If difficulty is experienced accessing the rear of the headlamp, remove the air cleaner or the battery as required. Refer to Fuel and Engine Management (chapter 7) and/or to Engine Electrical (chapter 6) for the procedure to remove and install the relevant components.

- 2 Prise the dust boot from the rear of the headlamp and place aside. Be careful not to misplace the rubber dust boot.
- 3 Unclip the spring retainer from the bulb and withdraw the bulb.

i Care must be taken not to handle the glass portion of the bulb as this will shorten the life of the bulb. Accidental fingerprints can be removed by applying methylated spirits to the bulb and drying with a clean tissue or cloth.

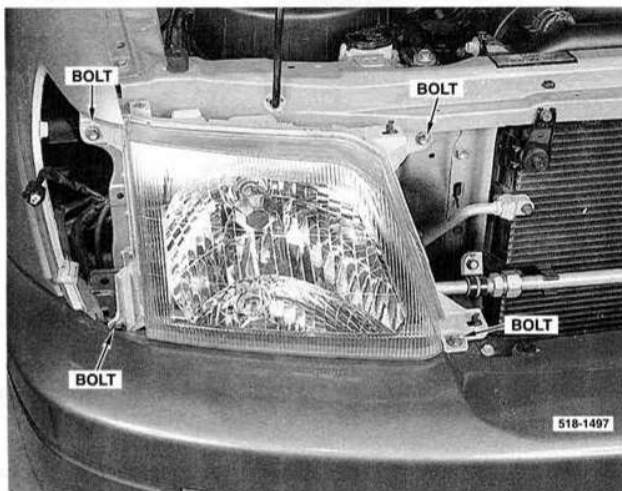
- 4 Carefully install the bulb into the headlamp, ensuring correct alignment of the bulb tangs.
- 5 Engage the spring retainer to the headlamp body.
- 6 Install the rubber dust boot and connect the wiring connector to the bulb.

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- 7 Check the operation of the headlamp and adjust the aim as described later in this chapter.

To Remove and Install

- 1 Remove the screw retaining the centre of the grille to the bonnet lock. Release the clips retaining the grille and withdraw grille from the vehicle.
- 2 Remove the screw retaining the turn signal lamp and while using finger pressure, lever the turn signal lamp assembly towards the front of the vehicle, releasing the retaining tabs. Disconnect the wiring connectors and withdraw the turn signal lamp assembly.
- 3 Remove the retaining bolts and partially withdraw the headlamp assembly. Disconnect the wiring connector and withdraw the assembly from the vehicle.



Grille and the turn signal lamp removed, showing the headlamp retaining bolts.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Hold the headlamp in position and install the retaining bolts finger tight before tightening securely.
- 2 Install the turn signal lamp and the grille.
- 3 Check and if necessary, adjust the headlamp aim, as described later in this chapter.

FOG LAMP

To Renew Bulb

- 1 Raise the front of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.
- 2 Working beneath the vehicle, disconnect the wiring connector from the rear of the bulb holder.
- 3 Turn the bulb holder anticlockwise and withdraw the bulb from the lamp.



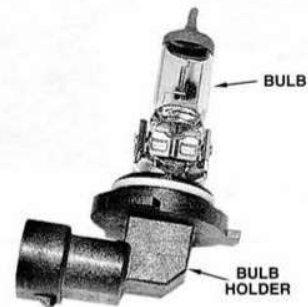
The bulb holder is part of the bulb and cannot be separated. Treat this bulb as a headlamp bulb i.e. ensure not to handle the glass portion of the bulb.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.

To Remove and Install

- 1 Raise the front of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.
- 2 Working beneath the vehicle, disconnect the wiring connector from the rear of the bulb holder.
- 3 Remove the bolts retaining the fog lamp to the bumper and remove from the front of the bumper.

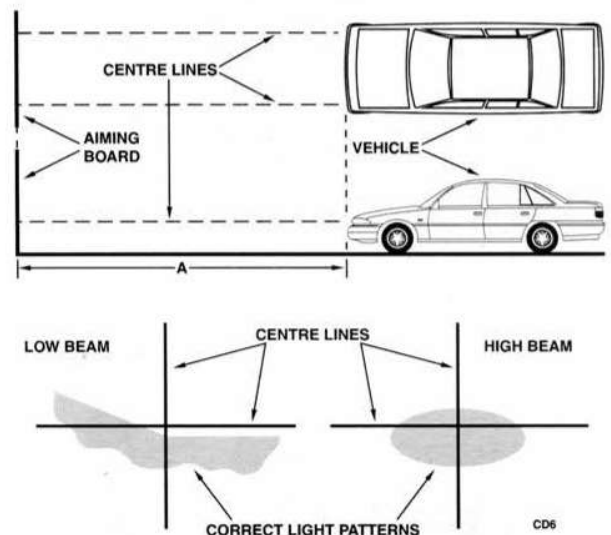
Installation is a reversal of the removal procedure.



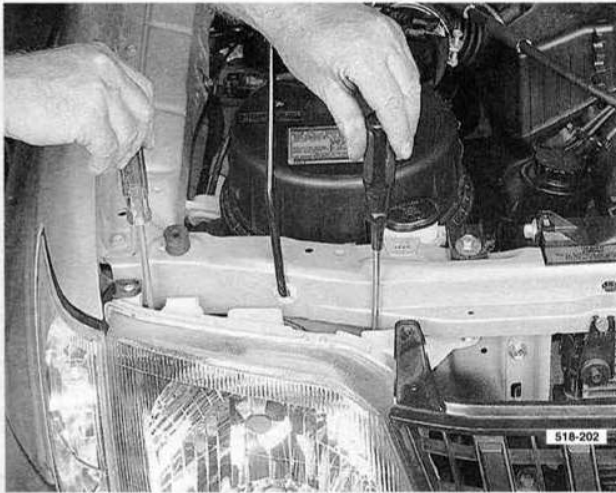
Fog lamp bulb removed. The bulb cannot be separated from the bulb holder.

TO ADJUST HEADLAMP AND FOG LAMP AIM

- 1 Ensure that the tyres are inflated to the correct pressure and that the vehicle is positioned on level ground.
- 2 Ensure that the vehicle is unladen, except for a normal amount of fuel in the fuel tank. If the vehicle regularly carries unusual load or tows a caravan, those loads should be in the vehicle while checking/adjusting the headlamp and, if applicable, the fog lamp aim.
- 3 When using headlamp aiming equipment, refer to the manufacturers instructions for the equipment being used.
- 4 When using an aiming board, position the vehicle immediately in front of, and square to the board.



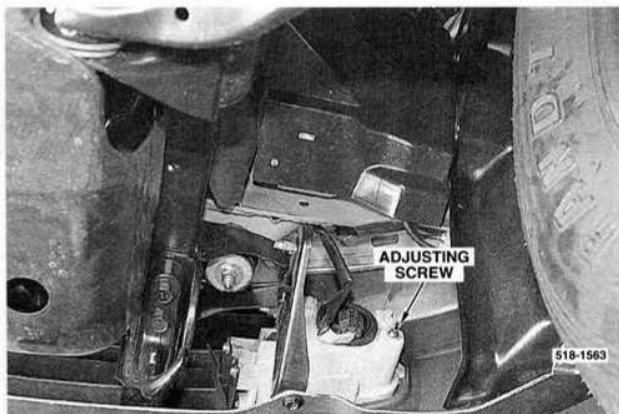
Headlamp adjustment using an aiming board. Dimension A to be 7.5 meters.



Adjusting the headlamp aim.

- 5 Mark a reference line on the board to correspond with the horizontal and vertical centre lines of the headlamps, and if applicable, the fog lamps.
- 6 Move the vehicle 7.6 metres from the board, ensuring that it is square to the board and that the centre lines are correctly aligned.
- 7 To adjust the headlamps, proceed as follows:
 - a Raise the bonnet. Switch On the headlamps and select low beam.
 - b Adjust the headlamps to comply with local regulations. As a guide, adjust the lamps so that the low beam pattern strikes the aiming board with the horizontal cut off point 105 mm below the horizontal centre line and the point where the beam raises from horizontal is on or to the left of the vertical centre line.
- 8 Where fitted, adjust the fog lamps while the headlamps are on low beam. Adjust the headlamps to comply with local regulations. As a guide, adjust the fog lamps so the centre of the fog lamp beam is approximately 150 mm below the headlamp horizontal centre line. Turn the adjusting screw on top of the fog lamp to achieve the correct alignment.

i The fog lamp beam can only be adjusted vertically. If the beam is not aligned with the vertical centre line, check the fog lamp mounting screws.

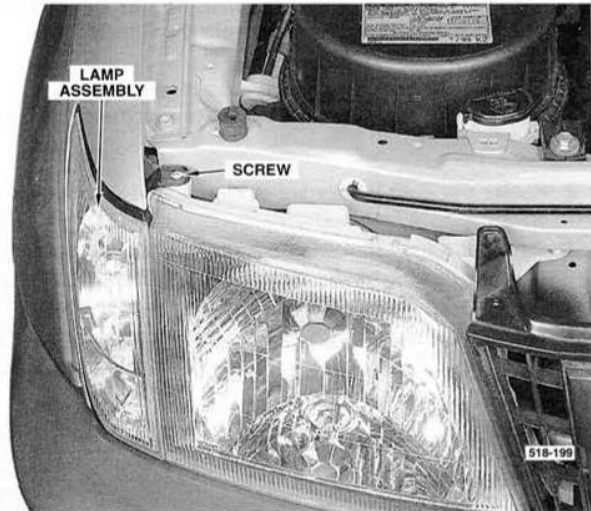


The fog lamp adjusting screw located at the rear of the fog lamp.

FRONT PARK AND TURN SIGNAL LAMP

To Renew Bulb

- 1 Remove the screw retaining the turn signal lamp.



The park and turn signal lamp assembly is retained by a screw.

- 2 Using finger pressure, lever the turn signal lamp assembly towards the front of the vehicle, releasing the retaining tabs. Disconnect the wiring connectors and withdraw the turn signal lamp assembly.
- 3 Rotate the relevant bulb holder and withdraw it from the lamp assembly.
- 4 If removing the turn signal lamp bulb, depress and rotate the bulb anticlockwise and withdraw it from the bulb holder.
- 5 If removing the park lamp bulb, firmly grasp and pull the bulb straight from the bulb holder.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Ensure that the contacts are clean, press the turn signal lamp bulb in and turn clockwise to install it to the bulb holder.
- 2 Securely connect the wiring connectors.



Removing the park lamp bulb.

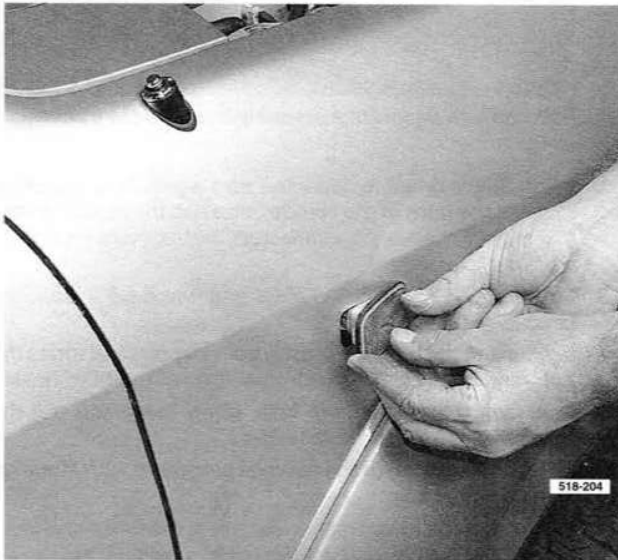
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SIDE TURN SIGNAL LAMP**To Renew Bulb**

- 1 Using finger pressure, carefully lever the rear of the lamp towards the front of the vehicle and at the same time outwards. Withdraw the lamp from the vehicle.

i If the lamp is tight a small flat bladed screwdriver, wrapped in cloth can be used to lever the lamp from the guard.

- 2 Rotate the bulb holder anticlockwise and withdraw it from the lamp.
- 3 Rotate the turn signal lamp bulb holder anticlockwise and remove the bulb holder from the lamp. Place the lamp aside.
- 4 Firmly grasp the bulb and pull it from the bulb holder.
- 5 Ensure that the contacts are clean and install a new bulb.
- 6 Install the bulb holder to the lamp and install the lamp to the vehicle.

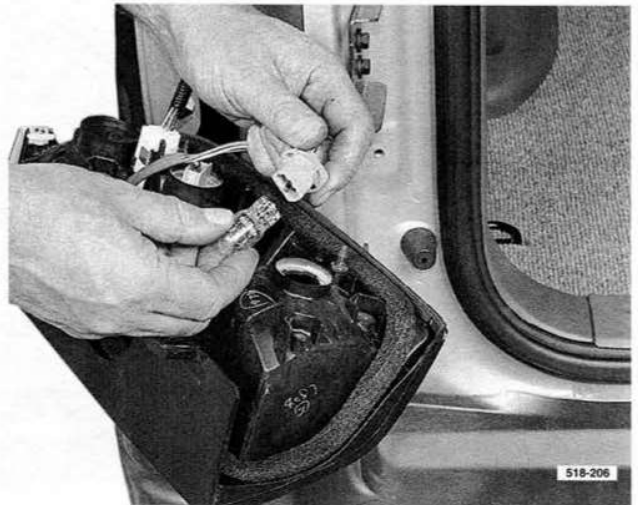


Removing the side turn signal lamp from the guard.

REAR COMBINATION LAMPS**To Renew Bulb**

- 1 To renew an upper combination lamp bulb, proceed as follows:
 - a Open the tailgate, remove the screws retaining the lamp assembly to the vehicle body and partially withdraw it from the vehicle.
 - b Rotate the relevant bulb holder anticlockwise and remove the bulb holder from the lamp.
 - c Firmly grasp the bulb and pull it from the bulb holder.
- 2 To renew a lower combination lamp bulb, proceed as follows:
 - a Remove the screws retaining the lens and withdraw it from the rear bumper.
 - b Depress and rotate the relevant bulb anticlockwise and remove the bulb from the bulb holder.

Installation is a reversal of the removal procedure, ensuring that the bulb holder contacts are clean.



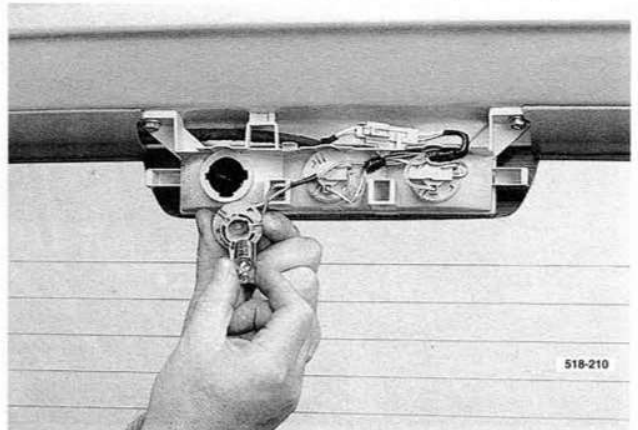
Removing the bulb from the combination lamp bulb holder.



Removing the lower combination lamp bulb.

HIGH MOUNTED STOP LAMP**To Renew Bulb**

- 1 Open the tailgate and depress the pin in the centre of the clip retaining the trim cover. Using a small flat bladed screwdriver, lift the clip from the cover. Repeat this on the second clip and withdraw the cover from the lamp assembly.



Removing the high mounted stop lamp bulb.

- 2 Rotate the relevant bulb holder anticlockwise and remove the bulb holder from the lamp.
- 3 Depress and rotate the bulb anticlockwise and remove the bulb from the bulb holder.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Ensure that the bulb holder contacts are clean.
- 2 Push the pin in the centre of the clip, until it protrudes from the flat side of the clip. Insert the clip to the cover and press the pin until it is flush with the clip.

NUMBER PLATE LAMP

To Renew Bulb

- 1 Remove the screws retaining the number plate lamp lens and withdraw the appropriate lens and lamp assembly.
- 2 Firmly grasp the bulb and pull it from the bulb holder.

Installation is a reversal of the removal procedure, ensuring that the bulb holder contacts are clean.



Removing the number plate lamp assembly.

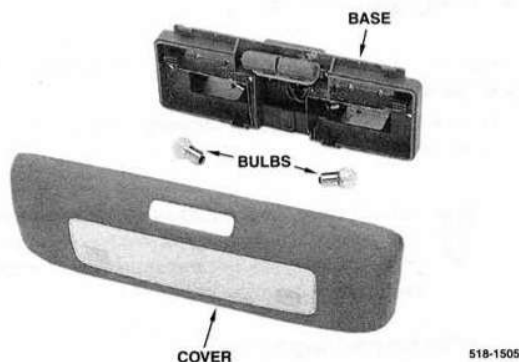
REVERSE LAMP

The reverse lamps are incorporated in the rear combination lamp assembly. The procedure to renew the bulb in the combination lamp is described previously in this chapter.

COURTESY AND READING LAMPS

To Renew Reading Lamp Bulbs

- 1 Using finger pressure, prise the reading lamp assembly from the roof lining. Disconnect the wiring connector and withdraw the lamp.



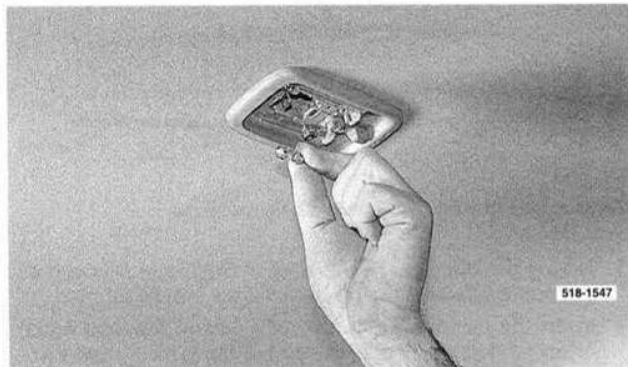
Reading lamp assembly dismantled.

- 2 Insert a flat bladed screwdriver between the cover and the base, on the opposite side of the switches. Release the tabs and separate the cover from the base.
- 3 Depress and rotate the appropriate bulb anticlockwise and withdraw it from the bulb holder.

Installation is a reversal of the removal procedure ensuring that the bulb holder is free from corrosion and that the bulb is of the correct type, voltage and wattage. If removed, install the fuse to the interior fuse and relay box.

To Renew Courtesy Lamp Bulbs

- 1 Using a small, flat bladed screwdriver, prise the lens from the lamp assembly.
- 2 Remove the festoon bulb from the bulb holder.
- 3 Install the bulb to the lamp ensuring that the terminals provide a good electrical contact.



Removing the courtesy lamp bulb.

Windscreen Wipers

WIPER BLADE

To Remove and Install

- 1 Raise the windscreen wiper arm and blade from the windscreen until it locks in the vertical position.



Removing the wiper blade from the wiper arm.

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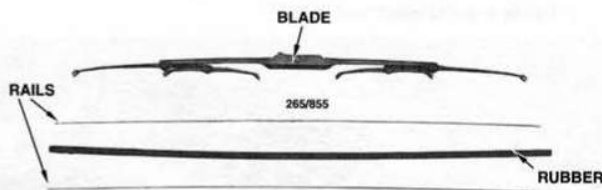
- Depress the clip at the centre of the wiper blade and slide the blade from the hook on the end of the wiper arm.

Installation is a reversal of the removal procedure, ensuring that the clip locks the blade securely.

WIPER BLADE RUBBER

To Renew

- Remove the windscreen wiper blade as previously described.
- Using a pair of pliers, firmly grasp the lower end of the rubber and pull the rubber tabs free from the metal blade claws. Continue to pull the rubber until it is completely removed from the blade claws.



Windscreen wiper blade and rubber components.

- Noting the direction of the bow of the metal rails, remove the metal rails from the rubber. Discard the old rubber.
- Insert the metal rails into the side slots of the new rubber, ensuring that the bow of the metal rails is facing away from the centre of the new rubber.
- Insert the rubber into the blade claws, ensuring that the metal rails remain engaged in the side slot of the rubber and that the tabs are facing toward the lower end of the wiper blade.
- Position the small slots of the end of the rubber blade between the metal claws of the wiper blade.
- Install the wiper blade to the wiper arm.

WIPER ARM

To Remove and Install

- Ensure that the wipers are in the Park position.



Removing the windscreen wiper arm.

- Prise the plastic cover and remove the wiper arm retaining nut.
- Carefully prise the wiper arm from the wiper pivot shaft taking care not to damage the vehicle.



It may be necessary to lift the arm from the windscreen and rock the arm back and forth with the nut loose to separate the components. Do not lever from the windscreen.

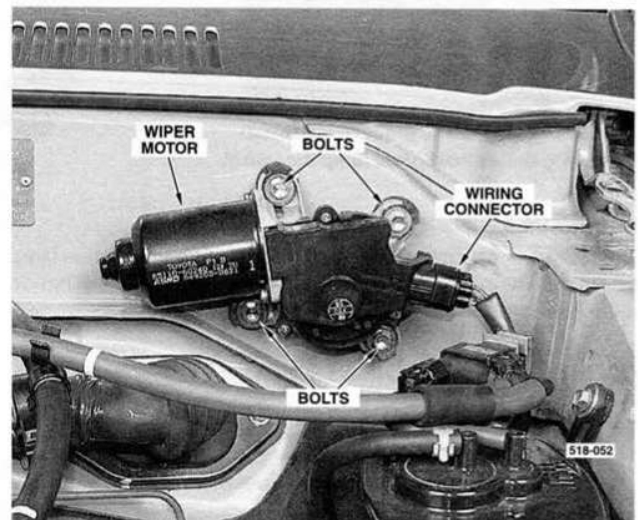
Installation is a reversal of the removal procedure with attention to the following points:

- With the wiper motor in the Park position, ensure that the wiper blades are parallel to the windscreen weather strip.
- Operate the windscreen wipers and ensure that the blades do not contact the windscreen surround.

WIPER MOTOR

To Remove and Install

- Disconnect the negative battery terminal.
- Disconnect the wiring connector from the wiper motor.
- Remove the retaining bolts and partially withdraw the wiper motor from the firewall.
- Carefully disconnect the linkage from the wiper motor and remove the motor from the vehicle.



Windscreen wiper motor installed.

Installation is a reversal of the removal procedure with attention to the following points:

- Ensure that the linkage is securely attached to the wiper motor arm.



If doubt exists about the park position when installing the wiper motor, it is advisable to remove the wiper arms to prevent damage to the arms or the vehicle when the motor is first operated.

- Tighten the retaining bolts securely.
- Ensure that the wiring connector is secure and making good contact.

WIPER LINKAGE

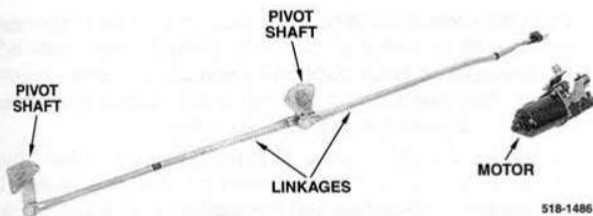
To Remove and Install

- 1 Remove the wiper arms and the wiper motor as previously described.
- 2 Raise the bonnet and remove the screws and the clips retaining the weather seal, located at the front of the plenum cover.
- 3 Release the clips at the front corners of the plenum cover and move the cover forward. Carefully lift the cover over the wiper pivot shafts and manoeuvre it from the vehicle.



Applying adhesive tape to the corners of the bonnet, the guards and the plenum will prevent damage to the panels.

- 4 Release the retaining tabs and withdraw the leaf screens covering the plenum.



Windscreen wiper motor and linkages removed.

- 5 Remove the pivot shaft retaining bolts from both sides of the vehicle and manoeuvre the wiper linkage from the vehicle.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Tighten the pivot shaft retaining bolts securely.
- 2 Install the wiper motor and connect the wiring connector securely.

Tailgate Wiper

WIPER BLADE

To Remove and Install

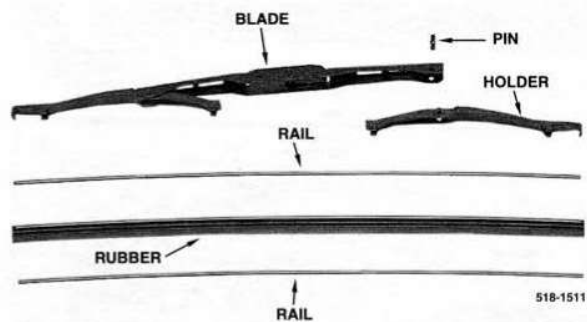
The removal and installation procedure for the tailgate wiper blade is similar to that described for the windscreen wiper blade.

WIPER BLADE RUBBER

To Remove and Install

- 1 Remove the wiper blade as previously described.
- 2 While holding the blade firmly, push the pin retaining the rubber holder to the blade. Do not misplace the pin.
- 3 Noting its installed direction, withdraw the holder from the blade and slide the rubber from the other holder claws.
- 4 Noting the direction of the bow of the metal rails, remove the metal rails from the rubber. Discard the old rubber.

Installation is a reversal of the removal procedure with attention to the following points:



The holder must be separated from the blade prior to removing the tailgate wiper rubber.

- 1 Insert the metal rails into the side slots of the new rubber, ensuring that the bow of the metal rails is facing away from the centre of the new rubber.
- 2 Insert the rubber into the holder claws, ensuring that the metal rails remain engaged in the side slot of the rubber.
- 3 Insert the holder to the blade and press the pin until it is locked securely.
- 4 Install the wiper blade to the wiper arm.

WIPER ARM

To Remove and Install

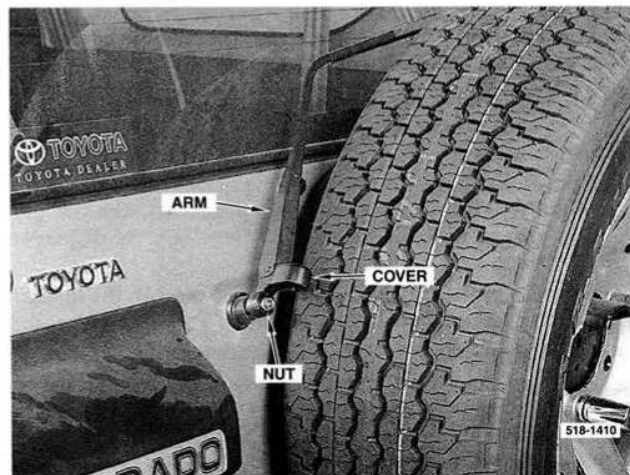
The removal and installation procedure for the tailgate wiper arm is similar to that described for the windscreen wiper arm.

WIPER MOTOR

To Remove and Install

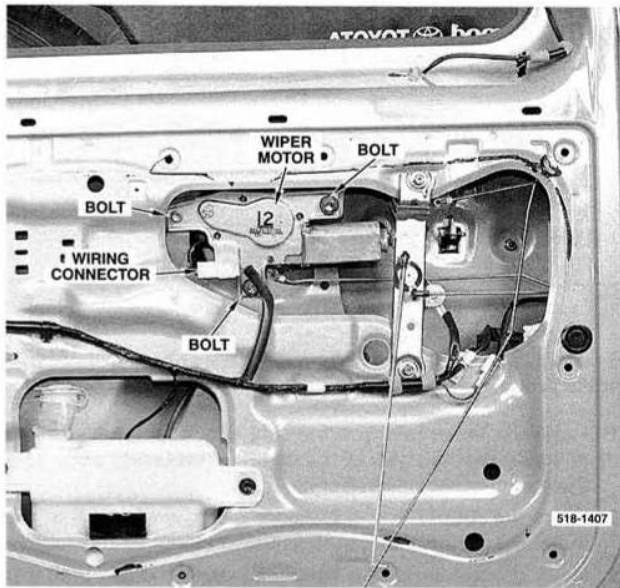
- 1 Disconnect the negative battery terminal.
- 2 Remove the wiper arm as previously described.
- 3 Remove the tailgate interior trim panel as described in Body (chapter 17) and disconnect the wiper motor wiring connector.
- 4 Remove the wiper motor retaining bolts and remove the wiper motor from the tailgate.

Installation is a reversal of the removal procedure with attention to the following points:



The tailgate wiper arm is retained by a nut.

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Tailgate wiper motor and associated components.

- 1 Ensure that the wiper motor pivot shaft sealing rubber in the tailgate is in serviceable condition. Renew if necessary.
- 2 Tighten all nuts and bolts securely.
- 3 Ensure that the wiring connector is secure and making good contact.

Sound System

SECURITY CODE

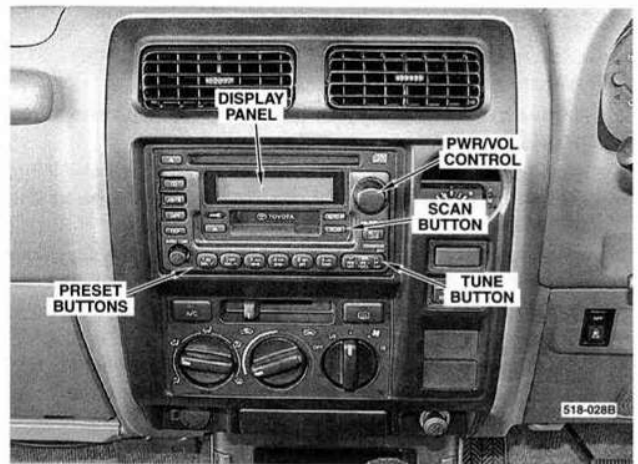
To deter the theft of the sound system from the vehicle, the system is designed to become inoperable if removed from the vehicle once a three digit security code has been entered. If the red LED on the sound system flashes when the ignition is Off, the security system has been activated.

The security code is determined by the owner of the vehicle and should be entered at the time of delivery of the vehicle. The code can be changed or erased only with the use of the original code therefore, once entered it should be written down in a safe place.

Disconnecting the battery terminal(s) will require the operator to enter the security code if the security system had been previously activated.

To Enter Code

- 1 If power has been cut and the security warning lamp on the sound system is flashing with the ignition Off, turn the ignition key to the ACC position. When "SEC" is displayed proceed to step 3.
- 2 If the security warning lamp is not flashing with the ignition Off, proceed as follows:
 - a Turn the ignition key to the ACC position.
 - b While pressing the 1 and 6 preset station buttons, depress and hold the PWR/VOL button until "SEC" is displayed in the display window.
 - c Press and hold the "TUNE" button then press the 1 preset button until the display shown on the illustration appears.



Various buttons are used to enter and cancel the security code on the sound system.

- 3 Enter the code as required by pressing the 1, 2 and 3 channel preset buttons repeatedly until the desired code is entered. For example, to enter code 345, press the 1 channel preset button four times, the 2 channel preset button five times and the 3 channel preset button six times.
- 4 When the desired code is displayed, press and hold the SCAN button, until "SEC" appears on the display panel. Release the SCAN button and the display panel will go blank, indicating the security system has memorised the security code and the system has been activated. If incorrect numbers were used, "Err" will be displayed before "SEC". In this case repeat the procedure from step 2 - c.

The sound system allows the operator nine attempts at entering the correct security code. The number appearing behind the "Err" indicates the number of errors made entering the security code. If after nine attempts the correct security code is not entered, the sound system will shut down and the red LED will remain lit. The sound system will have to be removed and taken to the sound system manufacturer to be reprogrammed.

When the security system is set, the red LED on the sound system will flash with the ignition key turned to the Lock position. Turning the sound system On will cause the panel to display "SEC" for a short time, indicating correct operation of the security system.



When these symbols on the display panel appear, the sound system security code can be entered.



The display panel shows the number of errors made entering the security code.

To Cancel Code

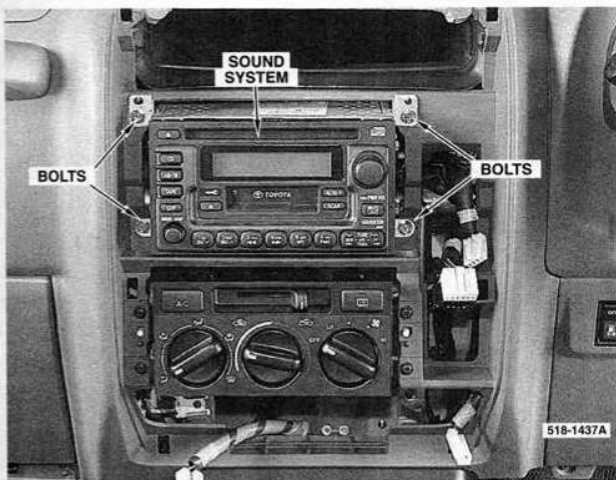
- 1 Follow steps 1 to 3 as described in the To Enter Code procedure.
- 2 When the required code has been entered, press and hold the SCAN button until the display shown on the illustration appears on the display panel. Hold the SCAN button until the display panel goes blank, indicating the security system has been cancelled.

If "Err" appears on the display panel and "SEC" is displayed, invalid numbers have been used and correct code must be entered. Repeat the procedure from step 3.

The number appearing behind the "Err" indicates the number of errors made entering the security code. The ninth error will lock the security system, rendering the sound system inoperable. In this case the sound system will have to be removed and taken to the sound system manufacturer to be reprogrammed.

TO REMOVE AND INSTALL

- 1 Ensure that the valid security code is available. Switch the ignition to Lock.
- 2 Remove the radio surround panel as follows:
 - a Using finger pressure, pull the bottom of the radio surround panel away from the dashboard to release the retaining clips.



Sound system retaining bolts.

- b Partially withdraw the panel and disconnect the wiring connectors from the various switches. Remove the panel from the dashboard.
- 3 Remove the retaining bolts and partially withdraw the sound system. Disconnect the aerial and the wiring connector(s) and withdraw the sound system from the dashboard.

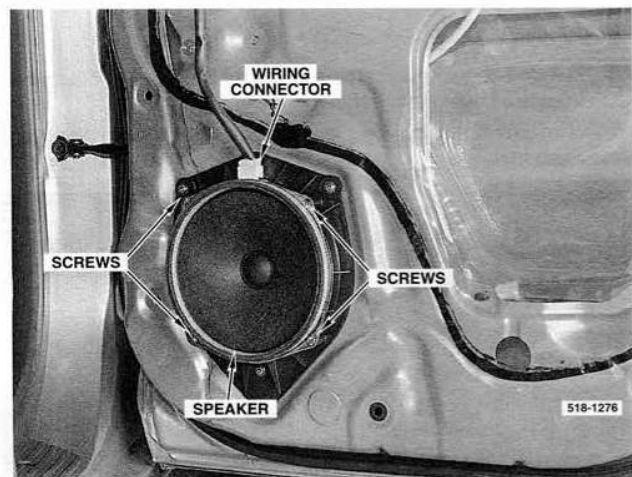
Installation is a reversal of the removal procedure with attention to the following points:

- 1 Connect the aerial lead and the wiring connector(s) securely prior to installing the sound system.
- 2 Slide the sound system into position until the retaining clips lock the system in the support bracket, ensuring that the wires are not trapped between the sound system and the support bracket.
- 3 Enter the security code as previously described.
- 4 Connect the wiring connectors to the radio surround panel switches and install the panel securely to the dashboard.

SPEAKERS

To Remove and Install

Removal of the front and rear door speakers involve removal of the relevant door trim as described in Body (chapter 17). The speakers are retained by screws.



Front door trim panel removed showing the door speaker.

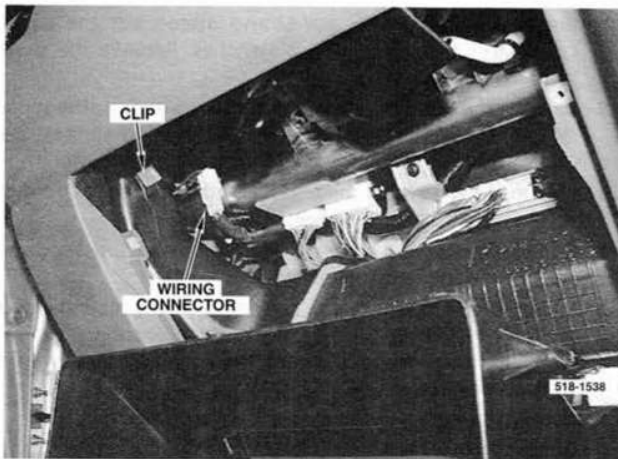
To remove the two speakers placed on either side of the top of dashboard, proceed as follows:

- 1 Lower the glove compartment or remove the lower dash panel, as necessary, referring to Body (chapter 17) under the Dashboard heading. On the passenger side remove the glove compartment roof panel retaining screw and withdraw the roof panel.
- 2 Release the clip retaining the wire, disconnect the wiring connector from the rear of the speaker.
- 3 Using finger pressure, lift the front of the speaker and withdraw the speaker from the dashboard.

Installation is a reversal of the removal procedure, ensuring that the clip and the wiring is securely connected.

On some models a speaker is installed to the lower dash panel, on the drivers side of the vehicle. To remove the speaker, proceed as follows:

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Glove compartment lowered showing the dashboard speaker wiring connector and clip.

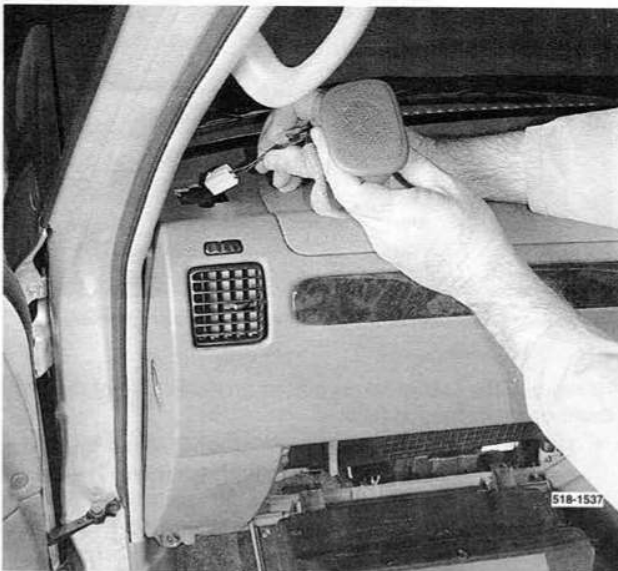
- 1 Working under the steering column, remove the bolt and screw retaining the lower dash panel.
- 2 Lower the panel away from the dashboard and disconnect the wiring connector from the speaker.



It is not necessary to remove the bonnet and the fuel filler door handles from the lower dash panel to access the speaker.

- 3 Remove the screws retaining the speaker and withdraw it from the lower dash panel.

When installing the speakers, ensure that the wiring connector is secure.



Removing the speaker from the dashboard.

RADIO AERIAL

To remove and install the aerial, the dashboard should be removed to allow removal of the old aerial lead from the retaining clips. However the old aerial lead can be cut, and the new lead placed behind the dashboard, using a more accessible route, eliminating the need to remove the dashboard.

To Remove and Install

- 1 Remove the sound system as previously described.
- 2 Remove the lower dash panel as follows:
 - a Remove the screws retaining the bonnet and fuel filler door remote handles. Pull the handles toward the front of the vehicle, to release the hooks, and manoeuvre the handles from the lower dash panel.
 - b Remove the bolt and screw retaining the lower dash panel.
 - c Partially remove the panel, disconnect the wiring connectors and withdraw the panel from the dashboard.
- 3 Release the retaining clip and withdraw the driver side kick panel.
- 4 Using wire cutters, cut the aerial lead, adjacent to the sealing grommet.
- 5 Raise the front of the vehicle and support on chassis stands. Refer to General Information (chapter 1) for the positions of the jacking points.
- 6 Working in the right hand wheel arch, remove the scrivenets and screws retaining the splashguard to the mudguard. Lower the splashguard from the vehicle and support it using a string.

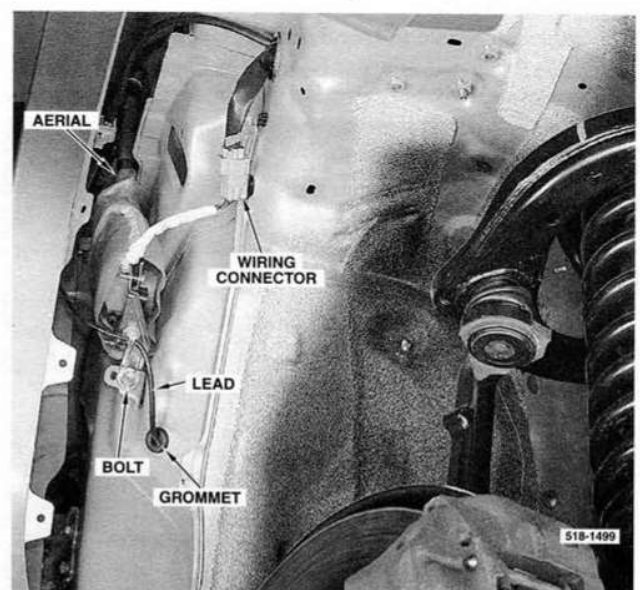


The splashguard is secured to the vehicle body behind the mudflap using a pop rivet. It is not necessary to remove the rivet as the aerial is easily accessible with the splashguard lowered.

- 7 Where fitted, disconnect the power aerial wiring connector. Withdraw the aerial lead from the passenger compartment and prise the sealing grommet from the inner guard.
- 8 While supporting the aerial, remove the bolt retaining the bracket to the inner guard and carefully lower the aerial away from the mudguard, ensuring that the paint is not damaged on the mudguard.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Hold the aerial in the required position, ensuring that the bezel on the aerial is correctly seated against the mudguard prior to tightening the retaining bolt.



Splashguard removed showing the power aerial component.

- 2 Apply sealant to the aerial lead grommet to prevent water leaks.
- 3 Ensure that the aerial lead is routed away from moving components and is secured using cable ties.
- 4 Connect the aerial lead and if applicable, the power aerial wiring connector securely to the sound system.

To Renew Power Aerial Mast

- 1 Remove the chrome nut from the top of the aerial.
- 2 Have an assistant sit in the drivers seat and turn the ignition key to Lock position.
- 3 While pressing the power aerial Up switch turn the ignition key to Acc position. The aerial motor will operate extending and then ejecting the mast from the aerial housing. Support the mast while it is ejected to prevent damage to the surrounding panels.

i If the mast is extensively damaged, use pliers to extract it from the housing.

- 4 Insert the end of the cable into the aperture of the aerial housing, with the serrations on the plastic end of the drive cable facing the rear of the vehicle. Feed the cable approximately 400 mm into the housing.
- 5 Have the assistant turn the ignition to the Lock position. The aerial motor will operate, pulling the drive cable into the aerial housing. Guide the aerial mast into the housing.

i If the plastic end of the drive cable does not engage with the gears on the motor, twist the cable slightly in both directions while operating the motor.

The new mast may not be fully retracted into the housing at this time. This does not indicate a malfunction. Proceed to the following steps.

- 6 Install the chrome nut to the top of the aerial. Tighten the nut securely.
- 7 Operate the aerial switch to confirm the correct operation of the aerial.

Ventilation Fan

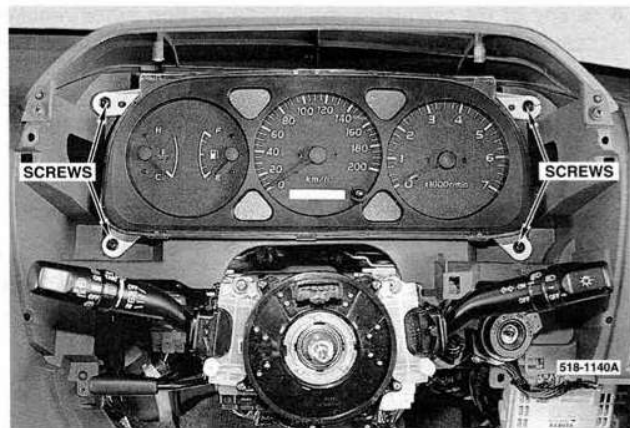
The removal and installation procedure for the ventilation fan motor is described in Ventilation (chapter 18).

Instrument Cluster

The instrument cluster is supplied as an assembly. The lens and the mask are the only components that can be purchased separately. Therefore, no procedures are included to remove individual gauges from the instrument cluster.

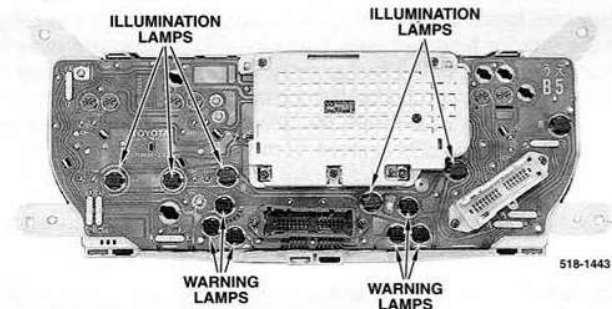
TO REMOVE AND INSTALL

- 1 Remove the lower dash panel as follows:
 - a Remove the screws retaining the bonnet and fuel filler door remote handles. Pull the handles toward the front of the vehicle, to release the hooks, and manoeuvre the handles from the lower dash panel.
 - b Remove the bolt and screw retaining the lower dash panel.



Instrument cluster retaining screw locations.

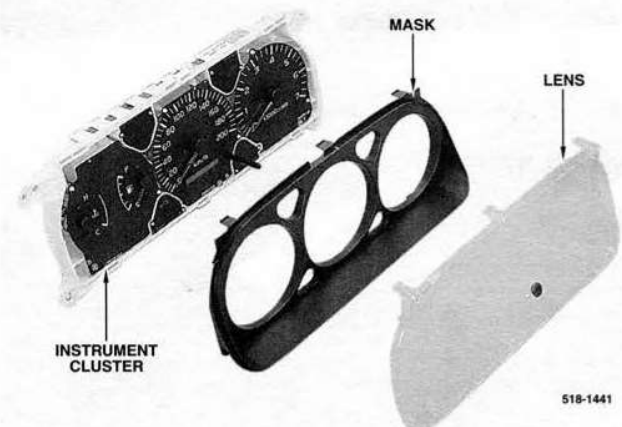
- c Partially remove the panel, disconnect the wiring connectors and withdraw the panel from the dashboard.
- 2 Release the clips and withdraw the ignition key surround panel.



Rear of the instrument cluster showing the bulbs. Not all bulbs are installed to all models.

- 3 Release the steering column adjusting lever and lock the lever it at the lowest setting.
- 4 Remove the retaining screws and withdraw the instrument cluster surround panel from the dashboard.
- 5 Remove the retaining screws and partially withdraw the instrument cluster. Disconnect the wiring connectors and remove the instrument cluster from the dashboard.

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Instrument cluster dismantled.

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- 6 If any of the warning lamp or illumination bulbs require renewal, rotate the bulb holder anticlockwise and remove them from the cluster assembly.
- 7 To renew the mask, depress the mask retaining clips and remove the mask from the front of the instrument cluster.



Do not touch the face of the mask or gauges with bare hands as the oil in the skin can leave a permanent stain.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Securely connect all wiring connectors.
- 2 Tighten the retaining screws securely.

Horn

All models are fitted with two horns, fitted behind the left hand side of the grille.

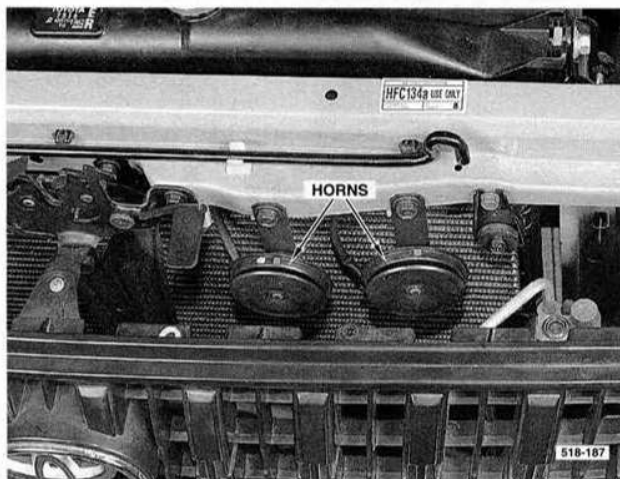
TO TEST

If the horn is inoperative, check the fuse in the interior fuse and relay box, located behind the lower dash panel. Check the relay in the interior fuse and relay box. On early models the relay is located adjacent to the flasher relay. On late models the relay is part of the integration relay. If the relay is functioning correctly a clicking sound is heard from the relay when the horn button is pressed. If no sound is emitted from the relay on early models, check the relay referring to the wiring diagrams at the end of this chapter. If faulty renew the relay. On late models the horn relay is part of the integration relay and cannot be renewed separately.

TO REMOVE AND INSTALL

- 1 Raise the bonnet and remove the bolt retaining the relevant horn to the front of the radiator support panel, behind the grille.
- 2 Partially withdraw the horn and disconnect the wiring connector. Remove the horn from the vehicle.
- 3 To check the horn, apply battery power to the horn terminals and the horn should sound. Renew the horn if necessary.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



Location of the horns.

HORN SWITCH

The horn switch on models without an airbag is incorporated in the pad in the centre of the steering wheel. On models with airbag the horn switch is part of the airbag. On all models, if the switch is faulty it must be renewed as an assembly.

To Remove and Install

- 1 Disconnect the negative battery terminal.
- 2 On models with an airbag, proceed as follows:



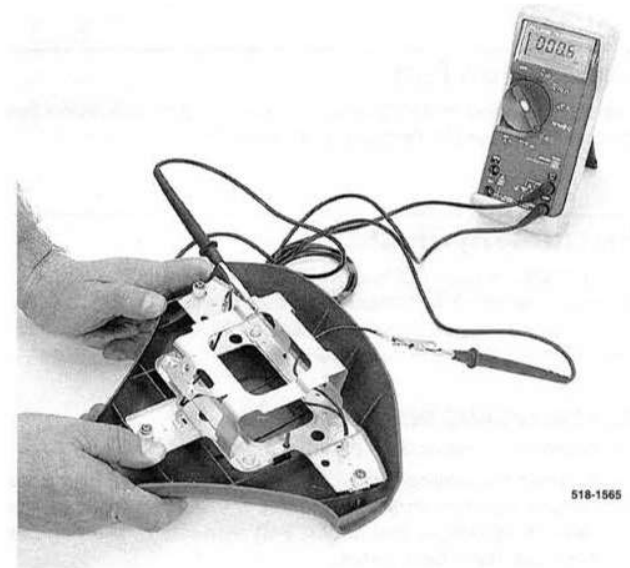
On models with airbags, the airbags will be disabled 90 seconds after disconnecting the battery terminal.

- a Remove the cover plugs from either side of the steering wheel and remove the airbag retaining bolts.
- b Partially withdraw the airbag assembly, slide the lock tab sideways and disconnect the airbag wiring connector.
- c Disconnect the horn wiring connector and remove the airbag assembly.
- 2 On models without an airbag, proceed as follows:
 - a Remove the horn pad retaining screw from beneath the steering wheel and partially withdraw the horn pad.
 - b Disconnect the wiring connector and withdraw the horn pad.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.

To Test

- 1 Remove the horn switch assembly as previously described.
- 2 Insert the probes of an ohmmeter into the horn wiring connector, ensuring that the probes make good contact with the wiring connector terminals, but do not touch each other. The ohmmeter should indicate an open circuit.
- 3 While pressing the horn switch, the ohmmeter should indicate a closed circuit.
- 4 Renew the drivers airbag/horn pad assembly, if a fault is indicated.



Testing the horn switch, using an ohmmeter.

Power Door Locks

The power door locks are controlled by the integration relay and its main components consist of up to three remote control transmitters, which can either form part of the ignition key, or can be a separate transmitter. The system also has a remote receiver module. The remote receiver module is fitted behind the left hand side kick panel and after receiving a signal from one of the remote control transmitters, instructs the integration relay to either lock or unlock the doors.

To simplify diagnosing and repairing faults within the power door lock system, the following procedures should be used in conjunction with the wiring diagrams in the rear of this chapter. Not all vehicles will have all components listed below due to differing vehicle trim levels.

DOOR ACTUATORS AND SWITCHES

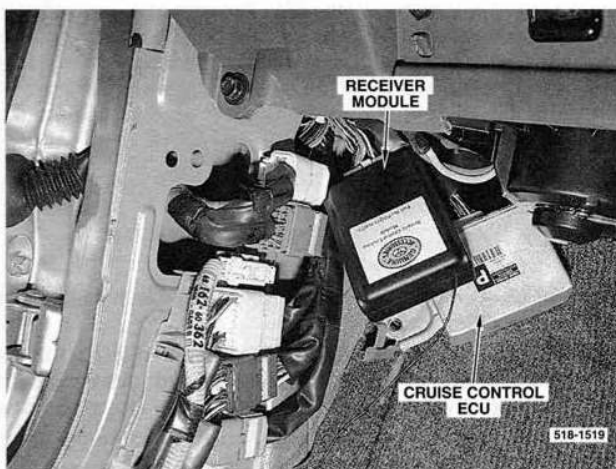
To Remove and Install

The door actuator and switch is part of the door lock assembly and can be removed and installed using the procedure in Body (chapter 17).

To Check — Actuators

- 1 Remove the door trim panel from the door with the faulty power door lock. Refer to Body (chapter 17).
 - 2 Using jumper leads connected to battery power, backprobe the actuator connector, connecting the positive lead to the blue/red wire and the negative lead to the blue/black wire on the integration relay wiring connector. The door actuator should cycle to the unlock position.
 - 3 Swap the positive and negative wires and the door locks should cycle to the lock position.
 - 4 If the door actuator cycles in both the lock and unlock positions, the actuator can be considered serviceable.
- If the door actuator does not cycle, proceed as follows:

i If none of the door lock actuators operate, it is more likely to be a fault with the power supply or the earth circuits for the integration relay. Use the wiring diagrams at the rear of this chapter to ensure that power and earth supplies are reaching the integration relay.



The remote receiver module is located behind the passenger side kick panel.

- a Check that the door lock linkages are not seized or damaged, causing the lock actuator to fail.
 - b Disconnect the wiring connector from the door actuator. Using an ohmmeter, check the wiring for continuity between the door lock actuator connector and the integration relay. Repair the wiring or connectors as necessary.
 - c Check the resistance between the motor wires at the door actuator connector, referring to the wiring diagrams.
- If an open circuit is indicated, renew the door lock assembly as described in Body (chapter 17).

To Check — Switches

- 1 Disconnect the wiring connector at the integration relay.
- 2 Connect the positive lead of an ohmmeter to the blue/white wire of the integration relay wiring connector. Continuity to earth should exist when the key in the door lock is turned to lock position.
- 3 Connect the positive lead of an ohmmeter to the blue/yellow wire of the integration relay wiring connector. Continuity to earth should exist when the key in the door lock is turned to unlock position. Renew the door lock assembly if necessary.
- 4 Repeat the procedure at the same terminals to check the door lock control switch, the tailgate lock control switch and the passenger door key switch.

DOOR LOCK SWITCH

The door lock switch on models without power windows is located on the lower dash panel. The procedure to renew the switch is described under the Lower Dash Panel Switches heading.

On models with power windows the door lock control switch is part of the power window switch assembly and cannot be renewed separately. The procedure to renew the switch assembly is described under the Power Windows heading.

REMOTE CONTROL TRANSMITTERS

Early models have a keypad, with non renewable battery. On late models the transmitter is built in the key head and is fitted with a renewable battery.



On model without power windows the door lock switch is located on the lower dash panel.

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To test the operation of the both types of transmitters, hold the pad or key close to a portable radio tuned to 94.0 MHz frequency. Ensure that the speaker is turned on and press the button on the transmitter. Interference should be heard on the portable radios speaker, indicating the correct operation of the transmitter.

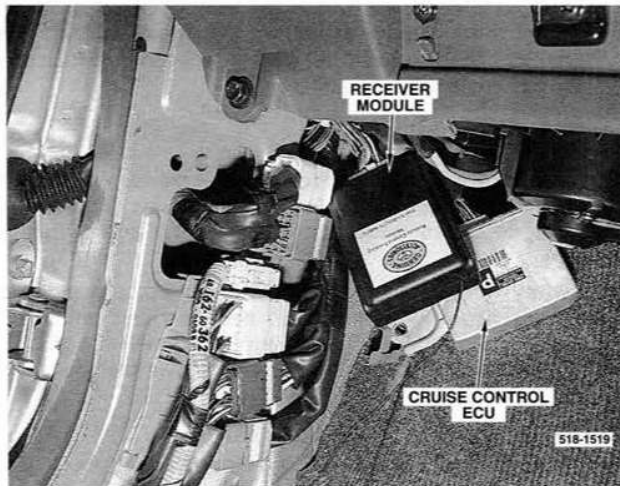
If no interference is heard, a flat battery in the transmitter or a faulty transmitter is indicated.

REMOTE RECEIVER MODULE

To Remove and Install

- 1 Remove the front screw retaining the left hand side scuff plate. Carefully raise the front of the scuff plate and slide the kick panel towards the rear of the vehicle. Release the kick panel retainer and withdraw the panel from the vehicle.
- 2 Remove the retaining bolt and lower the cruise control and the receiver modules. Disconnect the receiver module wiring connector and withdraw the module from the vehicle.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



The remote receiver module is located behind the passenger side kick panel.

Integration Relay

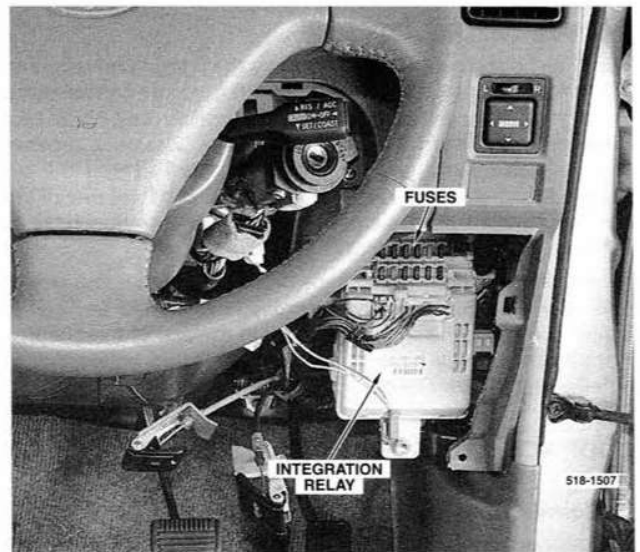
The integration relay is located in the lower half of the interior fuse box. The functions of the integration relay include the operation of the headlamp auto Off feature and the delay control of the interior lamps. Various other circuits also pass through the integration relay.

Due to the lack of information provided by the vehicle manufacturer about the internal circuitry of the integration relay, it is impossible to provide procedures to test its operation.

However, circuits passing through the relay can often be bypassed, where the integration relay is suspected of causing the fault. Refer to the wiring diagrams and if bypassing the relay rectifies the fault, it should be renewed.

TO REMOVE AND INSTALL

- 1 Remove the screws retaining the bonnet and fuel filler door remote handles. Push the handles toward the front of the vehicle, to release the hooks, and manoeuvre the handles from the lower dash panel.



The lower dash panel removed showing the location of the integration relay.

- 2 Remove the bolt and screw retaining the lower dash panel.
- 3 Partially remove the panel, disconnect the wiring connectors and withdraw the panel from the dashboard.
- 4 Release the air duct from the fittings, by pulling the ends of the duct firmly downward. Withdraw the duct from under the dashboard.
- 5 Remove the retaining bolts and lower interior fuse box from the dashboard. Disconnect the wiring connectors and withdraw the integration relay.

Installation is a reversal of the removal procedure, ensuring that the wiring connectors are securely connected.

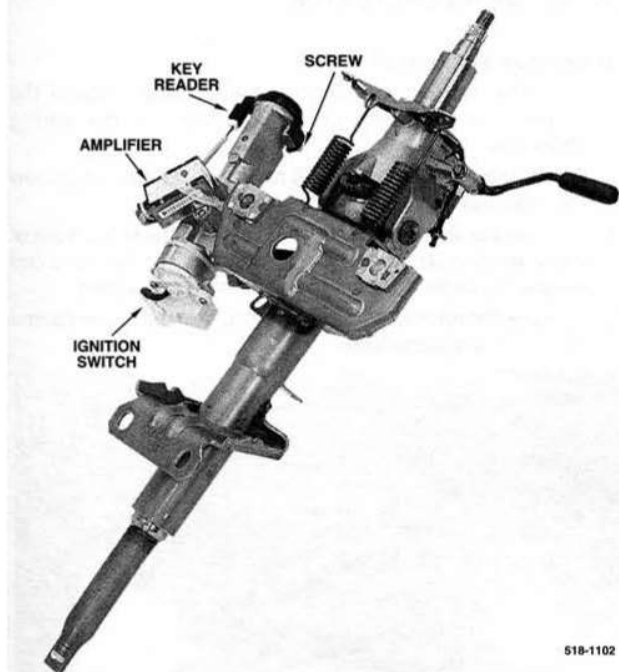
Security System

The security system provides the engine immobilisation features of vehicles covered in this manual. It consists of a transmitter in the key head of the ignition key, the ignition key reader, the amplifier, on early models the transmitter key computer and the engine ECU. On late models the transmitter key computer is incorporated within the engine ECU. The vehicle is supplied with two master keys, identifiable by the black key heads, and one sub key with a grey key head. The key cannot be separated from the key head. The transmitter in the ignition key is a separate transmitter to the remote control transmitter used to operate the power door locks.

KEY HEAD TRANSMITTER

To Code a Master Key

- 1 With all doors closed insert one of the registered master keys in the ignition lock.
- 2 Turn the ignition key to the On position and then back to the Lock position 5 times within fifteen seconds. Also open and close the driver side door once within that fifteen seconds.
- 3 Within the next twenty seconds, open and close the driver side door a further 6 times.
- 4 Remove the master key within twenty seconds of closing the driver side door for the first time.



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Steering column removed, showing the key reader and the amplifier.

- 5 Within ten seconds of removing the master key, insert the new key to be coded in the ignition lock.
- 6 Within the next ten seconds, turn the key to the On position and leave it for sixty seconds or more.
- 7 Once the sixty second passed, remove the key from the ignition lock.
- 8 If another new key is to be coded, insert that key to the ignition lock within ten seconds of removing the previously coded key, and repeat the procedure from step 5.
- 9 If another key is not to be coded, open and close the driver side door once.

To Code a Sub Key

- 1 With all doors closed insert one of the registered master keys in the ignition lock.
- 2 Turn the ignition key to the On position and then back to the Lock position 4 times within fifteen seconds. Also open and close the driver side door once within that fifteen seconds.
- 3 Within the next twenty seconds, open and close the driver side door a further 5 times.
- 4 Remove the master key within twenty seconds of closing the driver side door for the first time.
- 5 Within ten seconds of removing the master key, insert the new sub key to be coded in the ignition lock.
- 6 Within the next ten seconds, turn the key to On position and leave it for sixty seconds or more.
- 7 Once the sixty second passed, remove the key from the ignition lock.
- 8 If another sub key is to be coded, insert that key to the ignition lock within ten seconds of removing the previously coded sub key, and repeat the procedure from step 5.
- 9 If another sub is not to be coded, open and close the driver side door once.

IGNITION KEY READER

To Remove and Install

- 1 Working under the steering column, remove the lower dash panel as follows:
 - a Remove the screws retaining the bonnet and fuel filler door remote handles. Push the handles toward the front of the vehicle, to release the hooks, and manoeuvre the handles from the lower dash panel.
 - b Remove the bolt and screw retaining the lower dash panel.
 - c Partially remove the panel, disconnect the wiring connectors and withdraw the panel from the dashboard.
- 2 Release the clips and withdraw the ignition key surround panel.
- 3 Remove the screw retaining the ignition key reader, disconnect the wiring connector and withdraw the key reader.

Installation is a reversal of the removal procedure, ensuring that the wiring connectors are securely connected.

To Test

- 1 Remove the key reader as previously described.
- 2 Using an ohmmeter, test the continuity between the terminals of the key reader. Renew the key reader if continuity does not exist.

TRANSMITTER KEY COMPUTER — EARLY MODELS

To Remove and Install

- 1 Carefully prise the radio surround panel and partially withdraw it from the dashboard. Disconnect the wiring connectors and remove the radio surround panel from the vehicle.
- 2 Remove the screw retaining the transmitter key computer, partially withdraw the computer, disconnect the wiring connector and remove the computer from dashboard.



If difficulty experienced accessing the retaining screw, remove the centre console, referring to Body (chapter 17).

Installation is a reversal of the removal procedure, ensuring that the wiring connectors are securely connected.

If a new transmitter key computer was installed the master and sub keys must be coded as described next.

To Code

- 1 With all doors closed, insert the master key in the ignition lock.
- 2 Turn the master key to the On position and then back to Lock position and withdraw the master key from the ignition lock.
- 3 If another master key is to be coded, insert the key to be coded and, within ten seconds, repeat step 2. Repeat this with all master keys to be coded.
- 4 If no other master key is to be coded, open and close the driver side door within ten seconds of removing the last master key.
- 5 To code a sub key, proceed as follows:
 - a Insert the sub key to be coded in the ignition lock within ten seconds of finishing step 4.
 - b Turn the sub key to the On position and then back to Lock position and withdraw the sub key from the ignition lock.

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ENGINE ECU

The procedure to remove and install the engine ECU is described in Fuel and Engine Management (chapter 7).

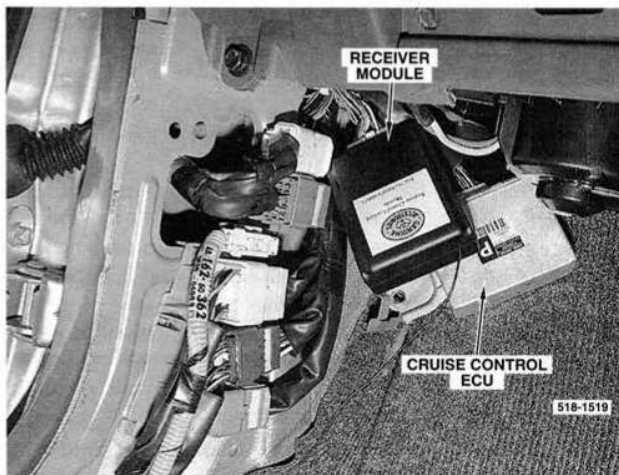
Cruise Control

The electronic cruise control system consists of an electronic control module, the control cable, the stop lamp switch, the clutch switch on manual transmission models and the control switch assembly. The system also interacts with the engine ECU. The cruise control ECU receives a signal from the speedometer and activates an electric motor inside the electronic control actuator. The motor adjusts the throttle position via the control cable to maintain the preset speed. The cruise control system will not activate until the vehicle speed is above 40 km/h and is deactivated when the brake pedal, clutch pedal, accelerator pedal or the control switch is depressed. The release switch, which incorporated into the stop lamp switch, is installed on the brake pedal support bracket. On models with a manual transmission, a release switch is installed to the clutch pedal support bracket. The clutch release switch and stop lamp release switch are all connected to the cruise control ECU and will send the signal to the actuator to disengage the cruise control once the relevant pedal is depressed. The cruise control system incorporates complex electronic circuitry, therefore it is recommended that the vehicle be taken to an authorised dealer for testing and repair should the operation of the system be in doubt and the following procedures fail to rectify the problem.

CRUISE CONTROL ECU**To Remove and Install**

- 1 Remove the front screw retaining the left hand side scuff plate. Carefully raise the front of the scuff plate and slide the kick panel towards the rear of the vehicle. Release the kick panel retainer and withdraw the panel from the vehicle.
- 2 Remove the retaining bolt and partially withdraw the power door lock and the cruise control modules. Disconnect the wiring connector from the cruise control module and withdraw the module from the vehicle.

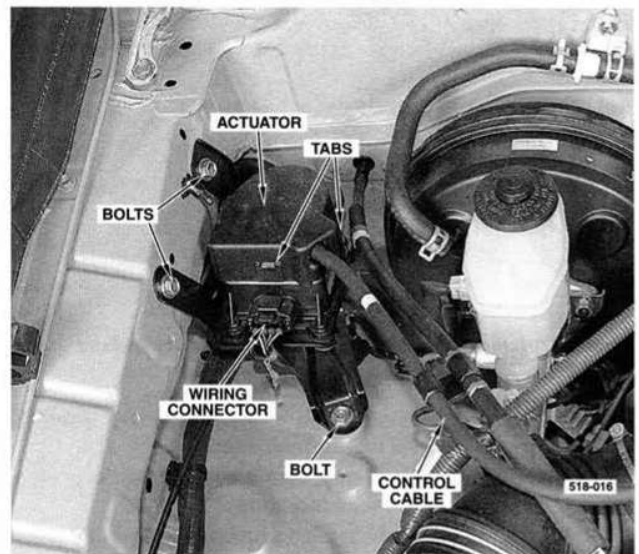
Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



The cruise control ECU is located behind the passenger side kick panel.

CRUISE CONTROL ACTUATOR**To Remove and Install**

- 1 Raise the bonnet. Working on the left hand side of the engine compartment, disconnect the actuator wiring connector.
- 2 Carefully pull the front and left hand side of the cover, below the retaining tabs and withdraw the cover.
- 3 Remove the screw retaining the control cable to the front of the bracket, rotate the actuator lever towards the cable and release the cable from the lever and from the bracket.
- 4 Remove the retaining bolts and withdraw the cruise control actuator from the vehicle.



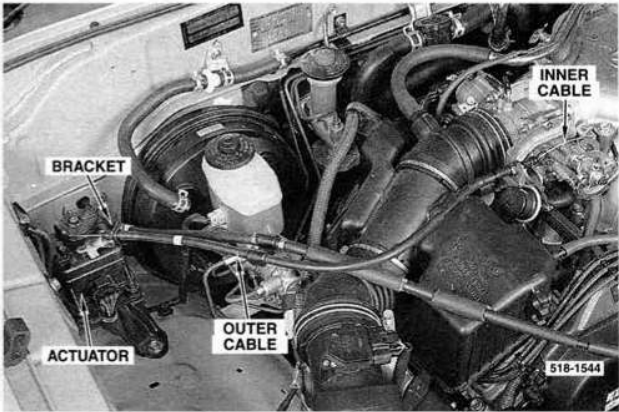
The cruise control actuator and associated components.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Install the actuator and tighten the retaining bolts securely.
- 2 Install the cable to the lever and to the bracket in that order. Tighten the retaining screw securely.
- 3 Install the cover and if necessary, adjust the control cable as described later in this heading.
- 4 Connect the wiring connector securely.

CONTROL CABLE**To Remove and Install**

- 1 Raise the bonnet. Working on the right hand side of the engine compartment, carefully pull the front and left hand side of the cover, below the retaining tabs and withdraw the cover from the actuator.
- 2 Remove the screw retaining the control cable to the front of the bracket, rotate the actuator lever towards the cable and release the cable from the lever and from the bracket.
- 3 Release the inner control cable from the lever on the side of the throttle body.
- 4 If the control cable is to be used again, mark the installed position of the adjusting and lock nuts. Loosen the locknut and release the outer cable from the bracket. Remove the control cable from the engine compartment.



Cruise control cable and associated components.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Install the outer cable to the bracket and engage the end of the inner cable in the lever on the throttle body.
- 2 If the old cable is being installed, ensure that the mark made during removal are correctly aligned prior to tightening the locknut.
- 3 If a new cable is being installed, adjust the cable as described next.

To Adjust

- 1 Loosen the control cable adjusting and locknut on the throttle body bracket.
- 2 Ensure that the throttle is fully closed, and pull the outer cable toward the control module, until the cable is about to move the throttle lever. Release the cable until there is about 3 – 5 mm freeplay in the inner cable.
- 3 Tighten the locknut, ensuring that the cable has not moved.
- 4 Operate the throttle and check that the freeplay has not altered.

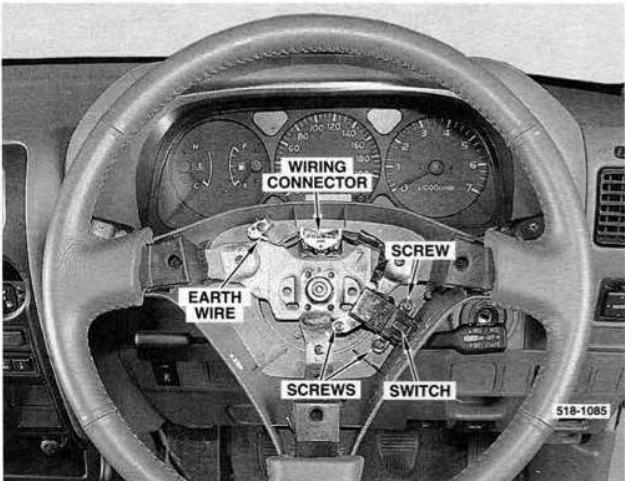
CONTROL SWITCHES

To Remove and Install

- 1 Disconnect the negative battery terminal.

i On models with an airbag, the airbag is disabled 90 seconds after disconnecting the battery terminal.

- 2 On models with an airbag, proceed as follows:
 - a Remove the cover plugs from either side of the steering wheel and using a T30 Torx socket, remove the airbag retaining bolts.
 - b Partially withdraw the airbag assembly, slide the lock tab sideways and disconnect the airbag wiring connector.
 - c Disconnect the horn wiring connector and remove the airbag assembly.
- 2 On models without an airbag, remove the horn pad retaining screw from beneath the steering wheel and partially withdraw the horn pad. Disconnect the wiring connector and withdraw the horn pad.
- 3 Remove the screw retaining the earth wire connector and disconnect the cruise control wiring connector.



Horn pad removed, showing the cruise control switch and components.

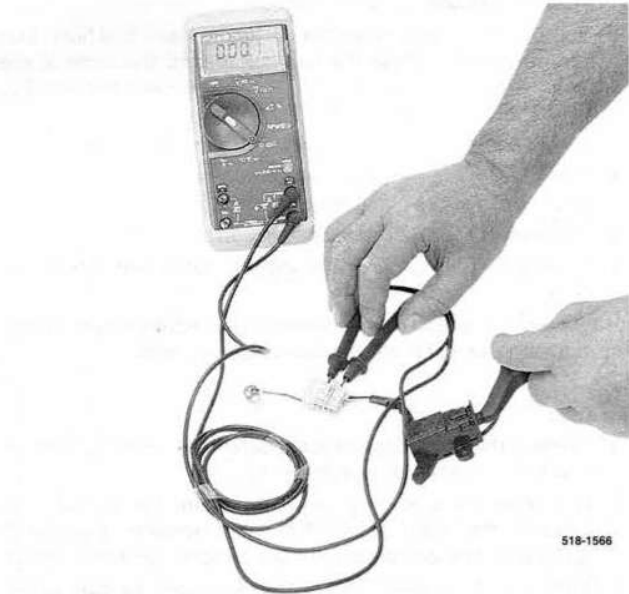
- 4 Remove the retaining screws and manoeuvre the cruise control switch from the steering wheel.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is secure and the retaining screws are securely tightened.

To Test

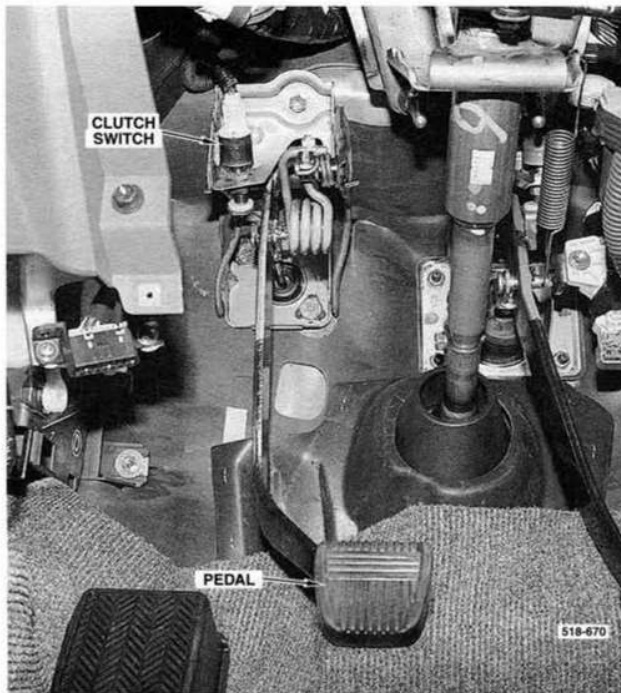
- 1 Remove the airbag/horn pad as previously described.
- 2 Disconnect the cruise control wiring connector. Using an ohmmeter check the resistances between the switch wiring while operating the switch. Renew the switch assembly if the resistances are outside specifications.

Switch Type	Wire Colour	Resistance
On - Off	Black - White/Black	Open Circuit
Cancel	Red - White/Black	Approx. 420 ohms
Resume	Black - White/Black	Approx. 68 ohms
Set	Black - White/Black	Approx. 200 ohms



Testing the cruise control switch, using an ohmmeter.

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Lower dash panel removed, showing the clutch switch.

RELEASE SWITCHES

Stop Lamp Switch

The procedure to remove, install, test and adjust the stop lamp switch is previously described in this chapter, under the Switches and Relays heading.

Clutch Switch

To Remove and Install

- 1 Working under the steering column, remove the lower dash panel as follows:
 - a Remove the screws retaining the bonnet and fuel filler door remote handles. Push the handles toward the front of the vehicle, to release the hooks, and manoeuvre the handles from the lower dash panel.
 - b Remove the bolt and screw retaining the lower dash panel.
 - c Partially remove the panel, disconnect the wiring connectors and withdraw the panel from the dashboard.
- 2 Disconnect the wiring connector from the clutch switch.
- 3 Loosen the locknut and unscrew the clutch switch from the clutch pedal bracket.

Installation is a reversal of the removal procedure, ensuring that the stop lamp switch is adjusted as described next.

To Test

- 1 Remove the lower dash panel as described under To Remove and Install the clutch switch.
- 2 Disconnect the wiring connector from the switch and connect the leads of an ohmmeter between the switch terminals. The ohmmeter should indicate an open circuit.
- 3 Press the clutch pedal down approximately 10 mm. In this position, the ohmmeter should indicate continuity.

- 4 If necessary, loosen the locknut and rotate the switch until the ohmmeter shows continuity as soon as the clutch pedal is depressed 10 mm and indicates an open circuit with the pedal at rest.
- 5 Tighten the locknut and check that the adjustment is still correct.
- 6 If the ohmmeter indicates an open circuit, regardless of the pedal position, the switch is faulty. Renew the switch as previously described.

Trailer Wiring

There are several brands of trailer wiring connectors available with a variety of pin configurations. The most common is the seven pin type which provides for two auxiliary circuits, usually used for interior lighting and electric trailer brakes.

When installing a trailer socket, it may be necessary to replace the original vehicle flasher unit with a heavy duty unit to maintain the flasher rate in accordance with local regulations. Local regulations may also require the installation of a dashboard mounted repeater lamp. Should the trailer socket and plug not be matched, adaptors can be made or obtained to facilitate connection.

TO INSTALL TRAILER SOCKET

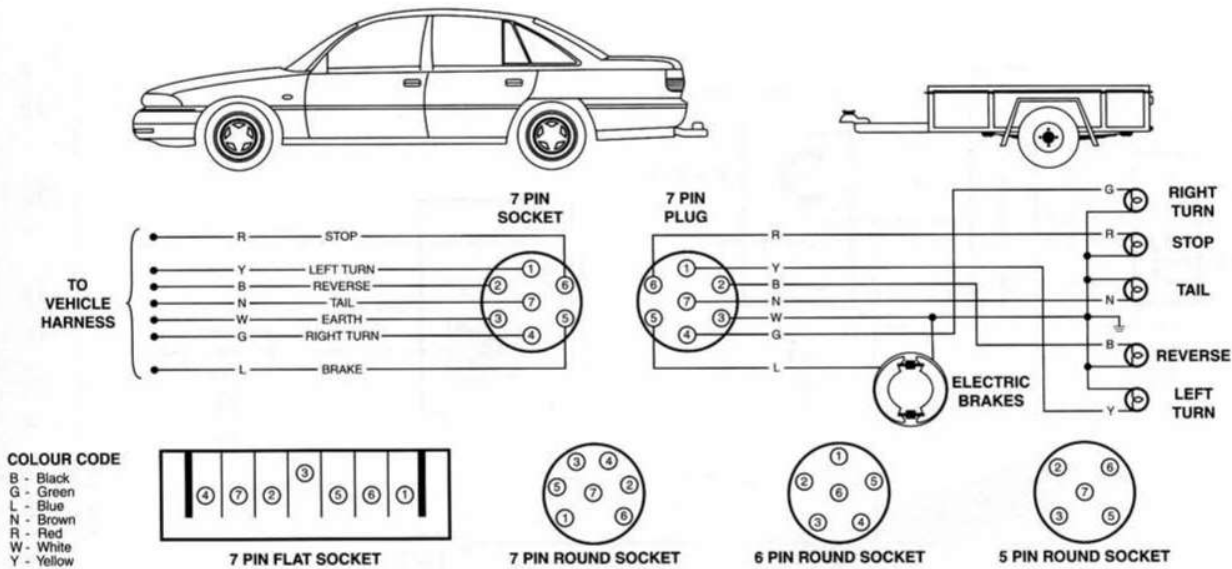
i A special wiring harness is available from the manufacturer that plugs into the wiring near the left hand rear combination lamp, adjacent to the vehicle jack. The wiring harness speeds up the installation process and also comes in a variety of pin configurations.

The minimum materials required are a trailer socket, mounting bracket, seven core flex, insulated wiring connectors and a rubber grommet.

- 1 Disconnect the negative battery terminal.
- 2 Locate the wiring harness for the lamps at the rear of the vehicle, located in the passenger side rear quarter panel compartment.
- 3 Identify the wires for the right turn signal lamp, left turn signal lamp, tail lamp, stop lamp, reverse lamp and earth.



The trailer wiring connector is located in the rear quarter panel compartment.



TERMINAL	SEVEN PIN SOCKET		TERMINAL	SIX PIN SOCKET		TERMINAL	FIVE PIN SOCKET	
1	Left turn signal lamp	Yellow	1	Tail lamp	Brown	2	Left turn signal lamp	Yellow
2	Reversing lamp	Black	2	Left turn signal lamp	Yellow	3	Earth	White
3	Earth	White	3	Right turn signal lamp	Green	5	Right turn signal lamp	Green
4	Right turn signal lamp	Green	4	Stop lamp	Red	6	Stop lamp	Red
5	Electric brakes	Blue	5	Auxiliary circuit	Blue	7	Tail lamp	Brown
6	Stop lamp	Red	6	Earth	White			
7	Tail lamp	Brown						

Vehicle and trailer wiring diagram to conform to Australian Standard AS2513. Sockets and plugs shown are as viewed from the terminal side of component.

- Use the vehicle wiring diagram in this chapter to determine the wire colour for each lamp circuit.
- Connect the seven core flex to the various lamp wires using insulated connectors.
 - For seven pin sockets and plugs, use the following standard trailer wiring code as shown in the illustration.
 - If necessary, drill a suitably sized hole through the vehicle floor and install the rubber grommet to the hole.

i Before drilling the hole, check whether there is an existing hole which may be used. Ensure that a rubber grommet is installed to prevent chafing of the wires.

- Pass the seven core flex through the rubber grommet.
- Cut the seven core flex to the required length and slide the dust cover onto the flex.
- Remove approximately 15 mm of insulation from each wire in the flex.
- Connect the wires of the seven core flex to the terminals of the socket using the standard wiring code and following the socket manufacturers connection procedure.
- Assemble the socket and install the dust cover to the rear of the socket.
- Install the mounting bracket as close as possible to the tow bar ball and high enough to maintain vehicle ground clearance.

- Install the socket to the mounting bracket.
- Connect a trailer plug to the socket and test for correct lamp operation.

TO INSTALL TRAILER PLUG

The minimum materials required are a trailer plug, seven core flex and insulated wiring connectors.

The installation procedure for the trailer plug is similar to that for the socket with attention to the following points:

- Connect the trailer wiring to the plug according to the standard wiring colour code and the plug manufacturers instructions.
Use a suitable length of seven core flex and insulated connectors should the trailer wiring not be long enough.
- If the trailer wiring does not conform to the standard colour code, identify each circuit as follows:
 - Locate the trailer earth wire.
 - Connect a jumper lead from the negative terminal of a 12 volt battery to the earth wire.
 - Connect a jumper lead to the positive terminal of the 12 volt battery and connect each of the trailer lamp wires in turn to the positive battery terminal jumper lead, noting the colour of the wire and lamp circuit operated.
- After installation, connect the trailer plug to the socket on the vehicle and check all lamps for correct lamp operation.